APPENDIX A

EPA Order 5360.1 A2 Mandatory Quality Assurance

APPENDIX B

USEPA Requirements for Quality Management Plans
EPA QA/R-2, March 2001

APPENDIX C

Checklist for QMP Review

APPENDIX D

USEPA Requirements for Quality Assurance Project Plans
EPA QA/R-5 Final Version, March, 2001

APPENDIX E

EPA Region 10 Expanded Guidance for Preparing Quality Assurance Project Plans, Revision 1.0 dated 12/7/98

EPA REGION 10 EXPANDED GUIDANCE FOR PREPARING QUALITY ASSURANCE PROJECT PLANS

Revision 1.0
December 7, 1998

Prepared by the Link sub-workgroup on QAPP Format & Content,
Consisting of Representatives from:

Region 10 Site Assessment, Remedial, and Removal/Emergency Response Project Managers
Office of Environmental Cleanup

Region 10 Quality Assurance Unit & Region 10 Manchester Laboratory Chemists
Office of Environmental Assessment

U.S. Environmental Protection Agency

Introduction

This document is mainly the contents of chapter 3 of Guidance for Preparing Quality Assurance Project Plans, EPA QA/G-5, EPA/600/R-98/018, February 1998 (minus the information in text boxes, figures, and tables Chapter 3 of G-5 contains guidance for addressing the 24 specific QAPP elements required by EPA QA/R-5, EPA Requirements for Quality Assurance Project Plans (Current Draft Version: October 1998). Either through t EPA Order 5360.1 Chg 1 or through EPA regulations covering contractors, assistants to states, tribes etc., R-5 is the requirements document for preparing QA Project Plans for EPA. R-5 is EPA's implementation of ANSI/ASQC E-4/1994. These EPA documents can be found at the following URL:

http://www.epa.gov/r10earth/offices/oea/qaindex.htm

The body of this document is text taken directly from chapter 3 of G-5. Additional Region 10 specific information has been added and is in separate paragraphs with sentences in all capitals. In addition, a specific format and content for tables has been included so that the review and use of QAPPs can be streamlined. QAPP preparers may choose to include additional tables for their own use, but the specific tables contained herein must used and must contain accurate information as they are the only tables that will be used by the Regional Sample Control Center (RSCC) to obtain analytical services via the EPA Region 10 Laboratory or the EPA Contract Laboratory Program (CLP).

Use of this format is <u>required</u> for all EPA contractor prepared documents for EPA Region 10 Superfund lead projects. Other programs are encouraged to utilize these additional format and content specifications as they will streamline the process for QAPP review and laboratory arrangements.

This document was prepared by a group of Superfund, EPA Laboratory and Quality Assurance staff from EPA Region 10. The initial LINK workgroup (consisting of one staff member from Superfund, the Lab, and QA) was formed to investigate working relationship issues between the three entities. The LINK workgroup published document with various issues and made a recommendation on which issues should be worked on first. This document is the work product developed by the LINK sub-workgroup established to address issues raised with QAPP format and content. A number of issues were addressed by the finalization of the G-5 document in July of 1998. Where there were still issues remaining, the workgroup addressed the issues by inserting Region 10 speci requirements.

Attached is an example QAPP (Palermo Well Field Site, Revision 0, December 2, 1998) that was developed following this guidance.

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QAPP ELEMENTS

A PROJECT MANAGEMENT

The following project management elements address the procedural aspects of project development and what to include in the QAPP project background, task description, and quality objectives elements. Summaries from R-5 are contained in the text box following the title of each element.

A1 TITLE AND APPROVAL SHEET

The title and approval sheet includes the title of the QAPP; the name(s) of the organization(s) implementing the project; and the names, titles, and signatures, and the signature dates of the appropriate approving officials. The approving officials typically include: the organization's Technical Project Manager, the organization's Quality Assurance Officer or Manager, the EPA (or other funding agency) Technical Project Manager/Project Officer, Laboratory Directors, Laboratory QA Officers, the EPA (or other funding agency) Quality Assurance Officer or Manager, and other key staff, such as the QA Officer of the prime contractor when a QAPP is prepared by a subcontractor organization.

The purpose of the approval sheet is to enable officials to document their approval of the QAPP. The title page (along with the organization chart) also identifies the key project officials for the work. The title and approval sheet should also indicate the date of the revision and a document number, if appropriate.

BELOW IS AN EXAMPLE APPROVAL SHEET:

PROJECT X

SITE Y
PIERCE, WASHINGTON

TDD NO:98-00-0000

PREPARED BY:
JOHN SMITH
REGION 10 CONTRACTOR
CONTRACT NUMBER: 0

REVISION: 0
DATE: OCTOBER 26, 1998

APPROVALS			
NAME	TITLE	SIGNATURE	DATE
JOE MANAGER	EPA TASK MONITOR		
JANE QUALITY	EPA QA OFFICER		
JEB FIELDING	CONTRACTOR PROJECT MANAGER		
JAMES WRIGHT	CONTRACTOR QA OFFICER		

A2 TABLE OF CONTENTS AND DOCUMENT CONTROL FORMAT

The table of contents lists all the elements, references, and appendices contained in a QAPP, including a list of tables and a list of figures that are used in the text. The major headings for most QAPPs should closely follow the list of required elements; an example is shown in Figure 2. While the exact format of the QAPP does not have to follow the sequence given here, it is generally more convenient to do so, and it provides a standard format to the QAPP reviewer. Moreover, consistency in the format makes the document more familiar to users, who can expect to find a specific item in the same place in every QAPP. The table of contents of the QAPP may include a document control component. This information should appear in the upper right-hand corner of each page of the QAPP when document control format is desired. For example:

Project No. or Name
Element or Section No.
Revision No.
Revision Date
Section/Element Page x of y

This component, together with the distribution list (see element A3), facilitates control of the document to help ensure that the most current QAPP is in use by all project participants. Each revision of the QAPP should have a different revision number and date.

A3 DISTRIBUTION LIST

All the persons and document files designated to receive copies of the QAPP, and any planned future revisions, need to be listed in the QAPP. This list, together with the document control information, will help the project manager ensure that all key personnel in the implementation of the QAPP have up-to-date copies of the plan. A typical distribution list appears in Figure 2.

IN ADDITION, A DATA DISTRIBUTION LIST IS TO BE INCLUDED IN THIS SECTION. THE DISTRIBUTION LIST SHALL SPECIFY WHO (NAME, ORGANIZATION AND TITLE) SHOULD RECEIVE WHAT TYPE OF DATA. THE LIST SHALL DIFFERENTIATE BETWEEN 1) ELECTRONIC DATA VS. HARD COPY DATA AND 2) VALIDATED DATA VS. PRELIMINARY/ VERBAL/AND OR FAXED DATA. AN EXAMPLE DATA DISTRIBUTION LIST IS BELOW:

DATA DISTRIBUTION					
NAME	TITLE	VALIDATED DATA[1]		PRELIMINARY DATA[2]	
		HARD COPY	ELEC-TRONIC	VERBAL	FAX
JOE MANAGER	EPA TASK MONITOR				
JANET WATERS	EPA HYDROGEOLOGIST				
JEB FIELDING	CONTRACTOR PROJECT MANAGER				

1 - PLACE IN ‘X’ IN THE CELL(S) ADJACENT TO THE RECIEPIENT FOR EITHER TYPE OF DATA.

2 - SPECIFY A PHONE AND/OR FAX NUMBER IN EACH CELL ADJACENT TO RECIPIENT(S) OF PRELIMINARY DATA.

A4 PROJECT/TASK ORGANIZATION

A4.1 Purpose/Background

The purpose of the project organization is to provide EPA and other involved parties with a clear understanding of the role that each party plays in the investigation or study and to provide the lines of authority and reporting for the project.

A4.2 Roles and Responsibilities

The specific roles, activities, and responsibilities of participants, as well as the internal lines of authority and communication within and between organizations, should be detailed. The position of the QA Manager or QA Officer should be described. Include the principal data users, the decision maker, project manager, QA manager, and all persons responsible for implementation of the QAPP. Also included should be the person responsible for maintaining the QAPP and any individual approving deliverables other than the project manager. A concise chart showing the project organization, the lines of responsibility, and the lines of communication should be presented; an example is given in Figure 3. For complex projects, it may be useful to include more than one chart—one for the overall project (with at least the primary contact) and others for each organization. Where direct contact between project managers and data users does not occur, such as between a project consultant for a potentially responsible party and the EPA risk assessment staff, the organization chart should show the route by which information is exchanged.

THIS AREA OF THE PLAN SHALL ALSO INCLUDE THE REGIONAL SAMPLE CONTROL CENTER COORDINATOR (RSCC) IF ANY LAB ARRANGEMENTS WITH THE EPA MANCHESTER LABORATORY OR CONTRACT LABORATORY PROGRAM (CLP) ARE NEEDED. IN ADDITION, THIS AREA OF THE PLAN NEEDS TO BE VERY CLEAR ON THE INITIAL POINTS OF CONTACT (I.E. EPA PROJECT MANAGER OR CONTRACTOR PROJECT MANAGER) WHEN IT COMES TO 1) RESOLVING PROBLEMS WITH SAMPLE RECEIPT AND/OR ANALYSIS AND 2) RELAYING PROJECT INFORMATION SUCH AS CASE NUMBERS, SAMPLE NUMBERS ETC. PHONE NUMBERS FOR ALL CONTACTS SHOULD BE INCLUDED.

A5 PROBLEM DEFINITION/BACKGROUND

A5.1 Purpose/Background

The background information provided in this element will place the problem in historical perspective, giving readers and users of the QAPP a sense of the project's purpose and position relative to other project and program phases and initiatives.

A5.2 Problem Statement and Background

This discussion must include enough information about the problem, the past history, any previous work or data, and any other regulatory or legal context to allow a technically trained reader to make sense of the project objectives and activities. This discussion should include:

- a description of the problem as currently understood, indicating its importance and programmatic, regulatory, or research context;

• a summary of existing information on the problem, including any conflicts or uncertainties that are to be resolved by the project;

• a discussion of initial ideas or approaches for resolving the problem there were considered before selecting the approach described in element A6, “Project/Task Description”; and

• the identification of the principal data user or decision maker (if know). Note that the problem statement is the first step of the DQO Process and the decision specification is the second step of the DQO Process.

A6 PROJECT/TASK DESCRIPTION AND SCHEDULE

A6.1 Purpose/Background

The purpose of the project/task description element is to provide the participants with a background understanding of the project and the types of activities to be conducted, including the measurements that will be taken and the associated QA/QC goals, procedures, and timetables for collecting the measurements.

A6.2 Description of the Work to be Performed

(1) Measurements that are expected during the course of the project. Describe the characteristic or property to be studied and the measurement processes and techniques that will be used to collect data.

(2) Applicable technical quality standards or criteria. Cite any relevant regulatory standards or criteria pertinent to the project. For example, if environmental data are collected to test for compliance with a permit limit standard, the standard should be cited and the numerical limits should be given in the QAPP. The DQO Process refers to these limits as "action levels," because the type of action taken by the decision maker will depend on whether the measured levels exceed the limit (Step 5 of the DQO Process).

(3) Any special personnel and equipment requirements that may indicate the complexity of the project. Describe any special personnel or equipment required for the specific type of work being planned or measurements being taken.

(4) The assessment techniques needed for the project. The degree of quality assessment activity for a project will depend on the project's complexity, duration, and objectives. A discussion of the timing of each planned assessment and a brief outline of the roles of the different parties to be involved should be included.

(5) A schedule for the work performed. The anticipated start and completion dates for the project should be given. In addition, this discussion should include an approximate schedule of important project milestones, such as the start of environmental measurement activities.

THE ESTIMATED SAMPLE RECEIPT DATES, THE DATA TURNAROUND TIME (BASED ON RECEIPT OF LAST SAMPLE FOR THE EPA MANCHESTER LAB OR BASED ON RECEIPT OF LAST SAMPLE PER SDG FOR RAP OR CLP), AND THE DATA VALIDATION TURNAROUND TIME (BASED ON RECEIPT OF THE COMPLETE DATA PACKAGE FROM THE LABORATORY) SHALL BE INCLUDED IN THE SCHEDULE. ALSO, THE SCHEDULE SHOULD INCLUDE BOTH HARD COPY AND ELECTRONIC DATA DELIVERY SCHEDULES AND A STATEMENT OF DATA DELIVERY PREFERENCE (I.E. PIECEMEAL VS. COMPLETE PACKAGES).

(6) Project and quality records required, including the types of reports needed. An indication of the most important

records should be given.

A7 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

A7.1 Purpose/Background

The purpose of this element is to document the DQOs of the project and to establish performance criteria for the mandatory systematic planning process and measurement system that will be employed in generating the data.

A7.2 Specifying Quality Objectives

This element of the QAPP should discuss the desired quality of the final results of the study to ensure that the data user’s needs are met. The Agency strongly recommends using the DQO Process (see Figure 4), a systematic procedure for planning data collection activities, to ensure that the right type, quality, and quantity of data are collected to satisfy the data user's needs. DQOs are qualitative and quantitative statements that:

- clarify the intended use of the data,
- define the type of data needed to support the decision,
- identify the conditions under which the data should be collected, and
- specify tolerable limits on the probability of making a decision error due to uncertainty in the data.

Data Quality Indicators (DQIs) can be evolved from DQOs for a sampling activity through the use of the DQO Process.

Appendix A.4 provides a crosswalk between the requirements of the QAPP and the DQO outputs. The QAPP should include a reference for a full discussion of the proposed DQOs. For exploratory research, sometimes the goal is to develop questions that may be answered by subsequent work. Therefore, researchers may modify activities advocated in QA/G-4 to define decision errors (see EPA QA/G-4R, Data Quality Objectives for Researchers).

A7.3 Specifying Measurement Performance Criteria

While the quality objectives state what the data user's needs are, they do not provide sufficient information about how these needs can be satisfied. The specialists who will participate in generating the data need to know the measurement performance criteria that must be satisfied to achieve the overall quality objectives. One of the most important features of the QAPP is that it links the data user's quality objectives to verifiable measurement performance criteria. Although the level of rigor with which this is done and documented will vary widely, this linkage represents an important advancement in the implementation of QA. Once the measurement performance criteria have been established, sampling and analytical methods criteria can be specified under the elements contained in Group B.

A8 SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

A8.1 Purpose/Background

The purpose of this element is to ensure that any specialized training requirements necessary to complete the projects are known and furnished and the procedures are described in sufficient detail to ensure that specific training skills can be verified, documented, and updated as necessary.

A8.2 Training

Requirements for specialized training for nonroutine field sampling techniques, field analyses, laboratory analyses, or data validation should be specified. Depending on the nature of the environmental data operation, the QAPP may need to address compliance with specifically mandated training requirements. For example, contractors or employees working at a Superfund site need specialized training as mandated by the Occupational Safety and Health (OSHA) regulations. If hazardous materials are moved offsite, compliance with the training requirements for shipping hazardous materials as mandated by the Department of Transportation (DOT) in association with the International Air Transportation Association may be necessary. This element of the QAPP should show that the management and project teams are aware of specific health and safety needs as well as any other organizational safety plans.

A8.3 Certification

Usually, the organizations participating in the project that are responsible for conducting training and health and safety programs are also responsible for ensuring certification. Training and certification should be planned well in advance for necessary personnel prior to the implementation of the project. All certificates or documentation representing completion of specialized training should be maintained in personnel files.

A9 DOCUMENTATION AND RECORDS

A9.1 Purpose/Background

This element defines which records are critical to the project and what information needs to be included in reports, as well as the data reporting format and the document control procedures to be used. Specification of the proper reporting format, compatible with data validation, will facilitate clear, direct communication of the investigation.

A9.2 Information Included in the Reporting Packages

The selection of which records to include in a data reporting package must be determined based on how the data will be used. Different "levels of effort" require different supporting QA/QC documentation. For example, organizations conducting basic research have different reporting requirements from organizations collecting data in support of litigation or in compliance with permits. When possible, field and laboratory records should be integrated to provide a continuous reporting track. The following are examples of different records that may be included in the data reporting package.

A9.2.1 Field Operation Records

The information contained in these records documents overall field operations and generally consists of the following:

• Sample collection records. These records show that the proper sampling protocol was performed in the field. At a minimum, this documentation should include the names of the persons conducting the activity, sample number, sample collection points, maps and diagrams, equipment/method used, climatic conditions, and unusual observations. Bound field notebooks are generally used to record raw data and make references to prescribed procedures and changes in planned activities. They should be formatted to include pre-numbered pages with date and signature lines.

• Chain-of-custody records. Chain-of-custody records document the progression of samples as they travel from the original sampling location to the laboratory and finally to their disposal area. (See Appendix C for an example of a chain-of-custody checklist.)

- QC sample records. These records document the generation of QC samples, such as field, trip, and equipment rinsate blanks and duplicate samples. They also include documentation on sample integrity and preservation and include calibration and standards' traceability documentation capable of providing a reproducible reference point. Quality control sample records should contain information on the frequency, conditions, level of standards, and instrument calibration history.

- General field procedures. General field procedures record the procedures used in the field to collect data and outline potential areas of difficulty in gathering specimens.

- Corrective action reports. Corrective action reports show what methods were used in cases where general field practices or other standard procedures were violated and include the methods used to resolve noncompliance. If applicable, to show regulatory compliance in disposing of waste generated during the data operation, procedures manifest and testing contracts should be included in the field procedures section.

A9.2.2 Laboratory Records

The following list describes some of the laboratory-specific records that should be compiled if available and appropriate:

- Sample Data. These records contain the times that samples were analyzed to verify that they met the holding times prescribed in the analytical methods. Included should be the overall number of samples, sample location information, any deviations from the SOPs, time of day, and date. Corrective action procedures to replace samples violating the protocol also should be noted.

- Sample Management Records. Sample management records document sample receipt, handling and storage, and scheduling of analyses. The records verify that the chain-of-custody and proper preservation were maintained, reflect any anomalies in the samples (such as receipt of damaged samples), note proper log-in of samples into the laboratory, and address procedures used to ensure that holding time requirements were met.

- Test Methods. Unless analyses are performed exactly as prescribed by SOPs, this documentation will describe how the analyses were carried out in the laboratory. This includes sample preparation and analysis, instrument standardization, detection and reporting limits, and test-specific QC criteria. Documentation demonstrating laboratory proficiency with each method used could be included.

- QA/QC Reports. These reports will include the general QC records, such as initial demonstration of capability, instrument calibration, routine monitoring of analytical performance, calibration verification, etc. Project-specific information from the QA/QC checks such as blanks (field, reagent, rinsate, and method), spikes (matrix, matrix spike replicate, analysis matrix spike, and surrogate spike), calibration check samples (zero check, span check, and mid-range check), replicates, splits, and so on should be included in these reports to facilitate data quality analysis.

A9.2.3 Data Handling Records

These records document protocols used in data reduction, verification, and validation. Data reduction addresses data transformation operations such as converting raw data into reportable quantities and units, use of significant figures, recording of extreme values, blank corrections, etc. Data verification ensures the accuracy of data transcription and calculations, if necessary, by checking a set of computer calculations manually. Data validation ensures that QC criteria have been met.

A9.3 Data Reporting Package Format and Documentation Control

The format of all data reporting packages must be consistent with the requirements and procedures used for data validation and data assessment described in Sections B, C, and D of the QAPP. All individual records that represent actions taken to achieve the objective of the data operation and the performance of specific QA functions are potential components of the final data reporting package. This element should discuss how these various components will be assembled to represent a concise and accurate record of all activities impacting data quality. The discussion should detail the recording medium for the project, guidelines for hand-recorded data (e.g., using indelible ink), procedures for correcting data (e.g., single line drawn through errors and initialed by the responsible person), and documentation control. Procedures for making revisions to technical documents should be clearly specified and the lines of authority indicated.

A9.4 Data Reporting Package Archiving and Retrieval

The length of storage for the data reporting package may be governed by regulatory requirements, organizational policy, or contractual project requirements. This element of the QAPP should note the governing authority for storage of, access to, and final disposal of all records.

B MEASUREMENT/DATA ACQUISITION

B1 SAMPLING PROCESS DESIGN (EXPERIMENTAL DESIGN)

B1.1 Purpose/Background

The purpose of this element is to describe all the relevant components of the experimental design; define the key parameters to be estimated; indicate the number and type of samples expected; and describe where, when, and how samples are to be taken. The level of detail should be sufficient that a person knowledgeable in this area could understand how and why the samples will be collected. This element provides the main opportunity for QAPP reviewers to ensure that the “right” samples will be taken. Strategies such as stratification, compositing, and clustering should be discussed, and diagrams or maps showing sampling points should be included. Most of this information should be available as outputs from the final steps of the planning (DQO) process. In addition to describing the design, this element of the QAPP should discuss the following:

- a schedule for project sampling activities,
- a rationale for the design (in terms of meeting DQOs),
- the sampling design assumptions,
- the procedures for locating and selecting environmental samples,
- a classification of measurements as critical or noncritical, and
- the validation of any nonstandard sampling/measurement methods.

Elements B1.2 through B1.8 address these subjects.

B1.2 Scheduled Project Activities, Including Measurement Activities

This element should give anticipated start and completion dates for the project as well as anticipated dates of major milestones, such as the following:

- schedule of sampling events;
- schedule for analytical services by offsite laboratories;
- schedule for phases of sequential sampling (or testing), if applicable;
- schedule of test or trial runs; and
- schedule for peer review activities.

The use of bar charts showing time frames of various QAPP activities to identify both potential bottlenecks and the need for concurrent activities is recommended.

B1.3 Rationale for the Design

The objectives for an environmental study should be formulated in the planning stage of any investigation. The requirements and the rationale of the design for the collection of data are derived from the quantitative outputs of the DQO Process. The type of design used to collect data depends heavily on the key characteristic being investigated. For example, if the purpose of the study is to estimate overall average contamination at a site or location, the characteristic (or parameter) of interest would be the mean level of contamination. This information is identified in Step 5 of the DQO Process. The relationship of this parameter to any decision that has to be made from the data collected is obtained from Steps 2 and 3 of the DQO Process.

The potential range of values for the parameter of interest should be considered during development of the data collection methodology and can be greatly influenced by knowledge of potential ranges in expected concentrations. For example, the number of composite samples needed per unit area is directly related to the variability in potential contaminant levels expected in that area. The choice between a probability-based (statistical) data collection design or a nonrandom (judgmental) data collection methodology depends on the ultimate use of the data being collected. This information is specified in Steps 5 and 6 of the DQO Process. Adherence to the data collection design chosen in Step 7 of the DQO Process directly affects the magnitude of potential decision error rates (false positive rate and false negative rate) established in Step 6 of the DQO Process. Any procedures for coping with unanticipated data collection design changes also should be briefly discussed.

B1.4 Design Assumptions

The planning process usually recommends a specific data collection method (Step 7 of the DQO Process), but the effectiveness of this methodology rests firmly on assumptions made to establish the data collection design. Typical assumptions include the homogeneity of the medium to be sampled (for example, sludge, fine silt, or wastewater effluent), the independence in the collection of individual samples (for example, four separate samples rather than four aliquots derived from a single sample), and the stability of the conditions during sample collection (for example, the effects of a rainstorm during collection of wastewater from an industrial plant). The assumptions should have been considered during the DQO Process and should be summarized together with a contingency plan to account for exceptions to the proposed sampling plan. An important part of the contingency plan is documenting the procedures to be adopted in reporting deviations or anomalies observed after the data collection has been completed. Examples include an extreme lack of homogeneity within a physical sample or the presence of analytes that were not mentioned in the original sampling plan. Chapter 1 of EPA QA/G-9 provides an overview of sampling plans and the assumptions needed for their implementation. EPA QA/G-5S provides guidance on the construction of sampling plans to meet the requirements generated by the DQO Process.

B1.5 Procedures for Locating and Selecting Environmental Samples

The most appropriate plan for a particular sampling application will depend on: the practicality and feasibility (e.g., determining specific sampling locations) of the plan, the key characteristic (the parameter established in Step 5 of the DQO Process) to be estimated, and the implementation resource requirements (e.g., the costs of sample collection, transportation, and analysis). This element of the QAPP should also describe the frequency of sampling and specific sample locations (e.g., sample port locations and traverses for emissions source testing, well installation designs for groundwater investigations) and sampling materials. When decisions on the number and location of samples will be made in the field, the QAPP should describe how these decisions will be driven whether by actual observations or by field screening data. When locational data are to be collected, stored, and transmitted, the methodology used must be described (or referenced) and include the following:

- procedures for finding prescribed sample locations,

- contingencies for cases where prescribed locations are inaccessible,

- location bias and its assessment, and

- procedures for reporting deviations from the sampling plan.

When appropriate, a map of the sample locations should be provided and locational map coordinates supplied. EPA QA/G-5S provides nonmandatory guidance on the practicality of constructing sampling plans and references to alternative sampling procedures.

B1.6 Classification of Measurements as Critical or Noncritical

All measurements should be classified as critical (i.e., required to achieve project objectives or limits on decision errors, Step 6 of the DQO Process) or noncritical (for informational purposes only or needed to provide background information). Critical measurements will undergo closer scrutiny during the data gathering and review processes and will have first claim on limited budget resources. It is also possible to include the expected number of samples to be tested by each procedure and the acceptance criteria for QC checks (as described in element B5, “Quality Control Requirements”).

B1.7 Validation of Any Nonstandard Methods

For nonstandard sampling methods, sample matrices, or other unusual situations, appropriate method validation study information may be needed to confirm the performance of the method for the particular matrix. The purpose of this validation information is to assess the potential impact on the representativeness of the data generated. For example, if qualitative data are needed from a modified method, rigorous validation may not be necessary. Such validation studies may include round-robin studies performed by EPA or by other organizations. If previous validation studies are not available, some level of single-user validation study or ruggedness study should be performed during the project and included as part of the project's final report. This element of the QAPP should clearly reference any available validation study information.

B2 SAMPLING METHODS REQUIREMENTS

B2.1 Purpose/Background

Environmental samples should reflect the target population and parameters of interest. As with all other considerations involving environmental measurements, sampling methods should be chosen with respect to the intended application of the data. Just as methods of analysis vary in accordance with project needs, sampling methods can also vary according to these requirements. Different sampling methods have different operational characteristics, such as cost, difficulty, and necessary equipment. In addition, the sampling method can materially affect the representativeness, comparability, bias, and precision of the final analytical result.

In the area of environmental sampling, there exists a great variety of sample types. It is beyond the scope of this document to provide detailed advice for each sampling situation and sample type. Nevertheless, it is possible to define certain common elements that are pertinent to many sampling situations with discrete samples (see EPA QA/G-5S). If a separate sampling and analysis plan is required or created for the project, it should be included as an appendix to the QAPP. The QAPP should simply refer to the appropriate portions of the sampling and analysis plan for the pertinent information and not reiterate information.

B2.2 Describe the Sample Collection, Preparation, and Decontamination Procedures

THIS AREA IS WHERE THE BULK OF THE FIELD PROCEDURES WILL BE DOCUMENTED. GENERIC SOPS FOR DECONTAMINATION TO COVER TRACE VS. REGULAR LEVEL ANALYSIS; FIELD VS. FIXED DECONTAMINATION PROCEDURES ARE NEEDED. THERE ARE SOME ON-GOING DIFFERENCES OF OPINION WITHIN OEA REGARDING DECONTAMINATION THAT NEED TO BE RESOLVED. A GENERAL CONSENSUS AND POLICY FOR DECONTAMINATION IS NEEDED.

(1) Select and describe appropriate sampling methods from the appropriate compendia of methods.

For each parameter within each sampling situation, identify appropriate sampling methods from applicable EPA regulations, compendia of methods, or other sources of methods that have been approved by EPA. When EPA-sanctioned procedures are available, they will usually be selected. When EPA-sanctioned procedures are not available, standard procedures from other organizations and disciplines may be used. A complete description of non-EPA methods should be provided in (or attached to) the QAPP. Procedures for sample homogenization of nonaqueous matrices may be described in part (2) as a technique for assuring sample representativeness. In addition, the QAPP should specify the type of sample to be collected (e.g., grab, composite, depth-integrated, flow- weighted) together with the method of sample preservation.

(2) Discuss sampling methods' requirements. Each medium or contaminant matrix has its own characteristics that define the method performance and the type of material to be sampled. Investigators should address the following:

• actual sampling locations,

• choice of sampling method/collection,

• delineation of a properly shaped sample,

• inclusion of all particles within the volume sampled, and

• subsampling to reduce the representative field sample into a representative laboratory aliquot.

Having identified appropriate and applicable methods, it is necessary to include the requirements for each method in the QAPP. If there is more than one acceptable sampling method applicable to a particular situation, it may be necessary to choose one from among them. DQOs should be considered in choosing these methods to ensure that: a) the sample accurately represents the portion of the environment to be characterized, b) the sample is of sufficient volume to support the planned chemical analysis, and c) the sample remains stable during shipping and handling.

(3) Describe the decontamination procedures and materials. Decontamination is primarily applicable in situations of sample acquisition from solid, semi-solid, or liquid media, but it should be addressed, if applicable, for continuous monitors as well. The investigator must consider the appropriateness of the decontamination procedures for the project at hand. For example, if contaminants are present in the environmental matrix at the 1% level, it is probably unnecessary to clean sampling equipment to parts-per-billion (ppb) levels. Conversely, if ppb-level detection is required, rigorous decontamination or the use of disposable equipment is required. Decontamination by-products must be disposed of according to EPA policies and the applicable rules and regulations that would pertain to a particular situation, such as the regulations of OSHA, the Nuclear Regulatory Commission (NRC), and State and local governments.

B2.3 Identify Support Facilities for Sampling Methods

Support facilities vary widely in their analysis capabilities, from percentage-level accuracy to ppb-level accuracy. The investigator must ascertain that the capabilities of the support facilities are commensurate with the requirements of the sampling plan established in Step 7 of the DQO Process.

B2.4 Describe Sampling/Measurement System Failure Response and Corrective Action Process

This section should address issues of responsibility for the quality of the data, the methods for making changes and corrections, the criteria for deciding on a new sample location, and how these changes will be documented. This section should describe what will be done if there are serious flaws with the implementation of the sampling methodology and how these flaws will be corrected. For example, if part of the complete set of samples is found to be inadmissable, how replacement samples will be obtained and how these new samples will be integrated into the total set of data should be described.

B2.5 Describe Sampling Equipment, Preservation, and Holding Time Requirements

This section includes the requirements needed to prevent sample contamination (disposable samplers or samplers capable of appropriate decontamination), the physical volume of the material to be collected (the size of composite samples, core material, or the volume of water needed for analysis), the protection of physical specimens to prevent contamination from outside sources, the temperature preservation requirements, and the permissible holding times to ensure against degradation of sample integrity.

HISTORICALLY, A SAMPLE HOLDING TIME/PRESERVATION TABLE WOULD BE IN THIS SECTION. HOWEVER, REGION 10 HAS ADOPTED THE USE OF ONE (TWO MAXIMUM) MASTER TABLES FOR THE QAPP THAT WILL FACILITATE SCHEDULING OF ANALYTICAL SERVICES. THIS TABLE(S) WILL COVER THE NUMBER, MATRICES, NUMBER/TYPES OF QC SAMPLES, METHODS, DETECTION LIMITS, PRECISION, ACCURACY, BOTTLES PER ANALYSIS, PRESERVATION, AND HOLDING TIME. THE TABLE(S) SHALL BE PLACED IN SECTION B4.

B2.6 References

See the actual G-5 document for publications useful in assisting the development of sampling methods.

B3 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

B3.1 Purpose/Background

This element of the QAPP should describe all procedures that are necessary for ensuring that:

(1) samples are collected, transferred, stored, and analyzed by authorized personnel;

(2) sample integrity is maintained during all phases of sample handling and analyses; and

(3) an accurate written record is maintained of sample handling and treatment from the time of its collection through laboratory procedures to disposal.

Proper sample custody minimizes accidents by assigning responsibility for all stages of sample handling and ensures that problems will be detected and documented if they occur. A sample is in custody if it is in actual physical possession or it is in a secured area that is restricted to authorized personnel. The level of custody necessary is dependent upon the project's DQOs. While enforcement actions necessitate stringent custody procedures, custody in other types of situations (i.e., academic research) may be primarily concerned only with the tracking of sample collection, handling, and analysis.

Sample custody procedures are necessary to prove that the sample data correspond to the sample collected, if data are intended to be legally defensible in court as evidence. In a number of situations, a complete, detailed, unbroken chain of custody will allow the documentation and data to substitute for the physical evidence of the samples (which are often hazardous waste) in a civil courtroom. Some statutes or criminal violations may still necessitate that the physical evidence of sample containers be presented along with the custody and data documentation.

An outline of the scope of sample custody--starting from the planning of sample collection, field sampling, sample analysis to sample disposal--should also be included. This discussion should further stress the completion of sample custody procedures, which include the transfer of sample custody from field personnel to lab, sample custody within the analytical lab during sample preparation and analysis, and data storage.

B3.2 Sample Custody Procedure

The QAPP should discuss the sample custody procedure at a level commensurate with the intended use of the data. This discussion should include the following:

(1) List the names and responsibilities of all sample custodians in the field and laboratories.

(2) Give a description and example of the sample numbering system.

(3) Define acceptable conditions and plans for maintaining sample integrity in the field prior to and during shipment to the laboratory (e.g., proper temperature and preservatives).

(4) Give examples of forms and labels used to maintain sample custody and document sample handling in the field and during shipping. An example of a sample log sheet is given in Figure 5; an example sample label is given in Figure 6.

(5) Describe the method of sealing shipping containers with chain-of-custody seals. An example of a seal is given in Figure 7.

(6) Describe procedures that will be used to maintain the chain of custody and document sample handling during transfer from the field to the laboratory, within the laboratory, and among contractors. An example of a chain-of-custody record is given in Figure 8.

(7) Provide for the archiving of all shipping documents and associated paperwork.

(8) Discuss procedures that will ensure sample security at all times.

(9) Describe procedures for within-laboratory chain-of-custody together with verification of the printed name, signature, and initials of the personnel responsible for custody of samples, extracts, or digests during analysis at the laboratory.

Finally, document disposal or consumption of samples should also be described. A chain-of-custody checklist is included in Appendix C to aid in managing this element. Minor documentation of chain-of-custody procedures is generally applicable when:

• Samples are generated and immediately tested within a facility or site; and

• Continuous rather than discrete or integrated samples are subjected to real- or near real-time analysis (e.g., continuous monitoring).

The discussion should be as specific as possible about the details of sample storage, transportation, and delivery to the receiving analytical facility.

THE LABORATORY WILL FOLLOW COC AS DETAILED IN THE INDIVIDUAL LABORATORY'S QAPP AND/OR SOPs. SAMPLE CUSTODY WITHIN THE LABORATORY(S) WILL BE DEPENDENT UPON INDIVIDUAL LABORATORY'S SOPS.

B4 ANALYTICAL METHODS REQUIREMENTS

B4.1 Purpose/Background

The choice of analytical methods will be influenced by the performance criteria, Data Quality Objectives, and possible regulatory criteria. If appropriate, a citation of analytical procedures may be sufficient if the analytical method is a complete SOP. For other methods, it may suffice to reference a procedure (i.e., from Test Methods for Evaluating Solid Waste, SW-846) and further supplement it with the particular options/variations being used by the lab, the detection limits actually achieved, the calibration standards and concentrations used, etc. If the procedure is unique or an adaption of a "standard" method, complete analytical and sample preparation procedures will need to be attached to the QAPP.

Specific monitoring methods and requirements to demonstrate compliance traditionally were specified in the applicable regulations and/or permits. However, this approach is being replaced by the Performance-Based Measurement System (PBMS). PBMS is a process in which data quality needs, mandates, or limitations of a program or project are specified and serve as a criterion for selecting appropriate methods. The regulated body selects the most cost-effective methods that meet the criteria specified in the PBMS. Under the PBMS framework, the performance of the method employed is emphasized rather than the specific technique or procedure used in the analysis. Equally stressed in this system is the requirement that the performance of the method be documented and certified by the laboratory that appropriate QA/QC procedures have been conducted to verify the performance. PBMS applies to physical, chemical, and biological techniques of analysis performed in the field as well as in the laboratory. PBMS does not apply to the method-defined parameters.

The QAPP should also address the issue of the quality of analytical data as indicated by the data's ability to meet the QC acceptance criteria. This section should describe what should be done if the calibration check samples exceed the control limits due to mechanical failure of the instrumentation, a drift in the calibration curve occurs, or if a reagent blank indicates contamination. This section should also indicate the authorities responsible for the quality of the data, the protocols for making changes and implementing corrective actions, and the methods for reporting the data and its limitations. Laboratory contamination from the processing of hazardous materials such as toxic or radioactive samples for analysis and their ultimate disposal should be a considered during the planning stages for selection of analysis methods. Safe handling requirements for project samples in the laboratory with appropriate decontamination and waste disposal procedures should also be described.

B4.2 Subsampling

If subsampling is required, the procedures should be described in this QAPP element, and the full text of the subsampling operating procedures should be appended to the QAPP. Because subsampling may involve more than one stage, it is imperative that the procedures be documented fully so that the results of the analysis can be evaluated properly.

B4.3 Preparation of the Samples

Preparation procedures should be described and standard methods cited and used where possible. Step-by-step operating procedures for the preparation of the project samples should be listed in an appendix. The sampling containers, methods of preservation, holding times, holding conditions, number and types of all QA/QC samples to be collected, percent recovery, and names of the laboratories that will perform the analyses need to be specifically referenced.

B4.4 Analytical Methods

The citation of an analytical method may not always be sufficient to fully characterize a method because the analysis of a sample may require deviation from a standard method and selection from the range of options in the method. The SOP for each analytical method should be cited or attached to the QAPP, and all deviations or alternative selections should be detailed in the QAPP. The matrix containing the subject analytes often dictates the sampling and analytical methods. Gaseous analytes often must be concentrated on a trap in order to collect a measurable quantity. If the matrix is a liquid or a solid, the analytes usually must be separated from it using various methods of extraction. Sometimes the analyte is firmly linked by chemical bonds to other elements and must be subjected to digestion methods to be freed for analysis.

Often the selected analytical methods may be presented conveniently in one or several tables describing the matrix, the analytes to be measured, the analysis methods, the type, the precision/accuracy data, the performance acceptance criteria, the calibration criteria, and etc. Appendix C contains a checklist of many important components to consider when selecting analytical methods.

TECHNICAL SOWS FOR ANALYTICAL WORK THAT IS SUB-CONTRACTED SHALL BE ATTACHED AS AN APPENDIX TO THE QAPP. THE SOWS ARE ATTACHED AS THEY ARE DEVELOPED.

ONE TO TWO MAIN TABLES DESCRIBING SAMPLES/ANALYSES/PRESERVATION/ CONTAINERS/HOLDING TIMES ETC. SHALL BE INCLUDED HERE. THE TABLE(S) SHOULD ALSO IDENTIFY WHETHER IT IS PLANNED UP-FRONT TO SUB-CONTRACT A PARTICULAR ANALYSIS. OTHERWISE, THE DEFAULT IS FOR THE RSCC TO 1) SCHEDULE WITH THE EPA MANCHESTER LABORATORY, 2) SCHEDULE CLP WORK NOT ACCEPTED BY THE EPA LAB WITH A CLP LAB, 3) NOTIFY THE APPROPRIATE EPA CONTACT OF THE NEED FOR A SUB-CONTRACT FOR NON-CLP ANALYTICAL NOT ACCEPTED BY THE EPA LABORATORY.

BELOW ARE TWO EXAMPLES OF <u>ONE</u> COMBINED TABLE (ONE FOR SOIL ONLY, ANOTHER FOR SOIL AND WATER SAMPLING). THIS INFORMATION MAY BE DIVIDED UP INTO TWO SEPARATE TABLES IN THIS SECTION, BUT ONE TABLE CONTAINING ALL OF THESE ELEMENTS IS PREFERRED:

EXAMPLE ‘SOIL ONLY’ PROJECT

Table B-4-1. Analyses Requested

NOTE: for mixed soil and water sample projects, place the associated water blanks in the corresponding blank columns in the row for the soil analysis. The row for the water analyses should only contain the water blanks associated with the field water samples. For soil only investigations, identify the water matrix as water - blank and fill in the water specific requirements but record the actual number of blanks in the row corresponding to the applicable soil analyses. For samples pre-designated for sub-contracting create a separate table with an appropriate title such as ‘Table B-4-2 Analyses to be sub-contracted’.

Analytical Parameter and Method	Matrix	Estimated Number of Field Samples	Estimated # of **LAB** QC Samples		Estimated # of **FIELD** QC Samples				Quantitation Limits	Accuracy[A]	Precision[A]	Complete-ness	Preservation	#/Type of Containers/field or field QC sample	Holding Time (days)
			MS	MSD OR D	DUP	TRIP BLANK	RINSE BLANK	PE							
VOA/CLP 0LM03.1	Soil	10			1	1	1	0	OLM03.1	OLM03.1	OLM03.1	85%	Cool to 4°C	Two 2-oz. Glass jars with Teflon lined lids	14 days from collection
BNA/CLP OLMO3.1	Soil	10			1	0	1	0	OLM03.1	OLM03.1	OLM03.1	85%	Cool to 4°C	Two 8-oz. wide mouth glass	14 days for extraction, analysis within 40 days of extraction
VOA/CLP 0LM03.1	Water - blank	see above							OLM03.1	OLM03.1	OLM03.1	85%	pH <2 with HCl	Two 40ml VOA vials	14 days from collection
BNA/CLP OLMO3.1	Water - blank	see above							OLM03.1	OLM03.1	OLM03.1	85%	Cool to 4°C	Two 1 liter amber glass	7 days for extraction, analysis within 40 days of extraction

A. Precision and accuracy are measured via matrix spike/matrix spike duplicate (MS/MSD - organics) or matrix spike/duplicate (MS/D - inorganics) analyses. Laboratory QC samples are not counted for requesting analytical services unless <u>extra</u> laboratory QC is being requested. For water CLP samples, generally the sample designated for this <u>laboratory</u> QC analysis require triple volume for organics and double volume for inorganics. Soil samples designated for laboratory QC require just the normal volume. For non-routine analyses, the requestor is responsible for determining whether additional volume is required for any matrix.

EXAMPLE WATER AND SOIL PROJECT

Table B-4-1. Analyses Requested

NOTE: for mixed soil and water sample projects, place the associated water blanks in the corresponding blank columns in the row for the soil analysis. The row for the water analyses should only contain the water blanks associated with the field water samples. For soil only investigations, identify the water matrix as water - blank and fill in the water specific requirements but record the actual number of blanks in the row corresponding to the applicable soil analyses. For samples pre-designated for sub-contracting create a separate table with an appropriate title such as 'Table B-4-2 Analyses to be sub-contracted'.

Analytical Parameter and Method	Matrix	Estimated Number of Field Samples	Estimated # of **LAB** QC Samples		Estimated # of **FIELD** QC Samples				Quantitation Limits	Accuracy[A]	Precision[A]	Comple t-eness	Preservation	#/Type of Containers/field or field QC sample	Holding Time (days)
			MS	MSD OR DUP	DUP	TRIP BLANK	RINSE BLANK	PE							
VOA/CLP 0LM03.1	Soil	10	1	1	1	1	1	0	OLM03.1	OLM03.1	OLM03.1	85%	Cool to 4°C	Two 2-oz. Glass jars with Teflon lined lids	14 days from collection
BNA/CLP OLMO3.1	Soil	10	1	1	1	0	1	0	OLM03.1	OLM03.1	OLM03.1	85%	Cool to 4°C	Two 8-oz. wide mouth glass	14 days for extraction, analysis within 40 days of extraction
VOA/CLP 0LM03.1	Water	5	1	1	1	1	0	0	OLM03.1	OLM03.1	OLM03.1	85%	pH <2 with HCl	Two 40ml VOA vials	14 days from collection
BNA/CLP OLMO3.1	Water	5	1	1	1	0	0	0	OLM03.1	OLM03.1	OLM03.1	85%	Cool to 4°C	Two 1 liter amber glass	7 days for extraction, analysis within 40 days of extraction

A. Precision and accuracy are measured via matrix spike/matrix spike duplicate (MS/MSD - organics) or matrix spike/duplicate (MS/D - inorganics) analyses. Laboratory QA/QC samples are not counted for requesting analytical services unless extra laboratory QC is being requested. For water CLP samples, generally the sample designated for this laboratory QA/QC analysis require triple volume for organics and double volume for inorganics. Soil samples designated for laboratory QA/QC require just the normal volume. For non-routine analyses, the requestor is responsible for determining whether additional volume is required for any matrix.

B5 QUALITY CONTROL REQUIREMENTS

ON A PROJECT SPECIFIC BASIS, DISCUSS BLIND/DOUBLE BLIND PE SAMPLE USEAGE AND ANY EXTRA QC REQUIREMENTS FOR THE PROJECT THAT ARE NOT COVERED BY THE SELECTED METHODS.

B5.1 Purpose/Background

QC is “the overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer.” QC is both corrective and proactive in establishing techniques to prevent the generation of unacceptable data, and so the policy for corrective action should be outlined. This element will rely on information developed in section A7, “Quality Objectives and Criteria for Measurement Data,” which establishes measurement performance criteria.

B5.2 QC Procedures

This element documents any QC checks not defined in other QAPP elements and should reference other elements that contain this information where possible. Most of the QC acceptance limits of EPA methods are based on the results of interlaboratory studies. Because of improvements in measurement methodology and continual improvement efforts in individual laboratories, these acceptance limits may not be stringent enough for some projects. In some cases, acceptance limits are based on intralaboratory studies (which often result in narrower acceptance limits than those based on interlaboratory limits), and consultation with an expert may be necessary. Other elements of the QAPP that contain related sampling and analytical QC requirements include:

- Sampling Process Design (B1), which identifies the planned field QC samples as well as procedures for QC sample preparation and handling;

- Sampling Methods Requirements (B2), which includes requirements for determining if the collected samples accurately represent the population of interest;

- Sample Handling and Custody Requirements (B3), which discusses any QC devices employed to ensure samples are not tampered with (e.g., custody seals) or subjected to other unacceptable conditions during transport;

- Analytical Methods Requirements (B4), which includes information on the subsampling methods and information on the preparation of QC samples in the sample matrix (e.g., splits, spikes, and replicates); and which defines prescribed criteria for triggering recalibration (e.g., failed calibration checks).

Many QC checks result in measurement data that are used to compute statistical indicators of data quality. For example, a series of dilute solutions may be measured repeatedly to produce an estimate of the instrument detection limit. The formulas for calculating such Data Quality Indicators (DQIs) should be provided or referenced in the text. This element should also prescribe any limits that define acceptable data quality for these indicators (see also Appendix D, “Data Quality Indicators”). A QC checklist should be used to discuss the relation of QC to the overall project objectives with respect to:

- the frequency and point in the measurement process in which the check sample is introduced,

- the traceability of the standards,

- the matrix of the check sample,

- the level or concentration of the analyte of interest,
- the actions to be taken if a QC check identifies a failed or changed measurement system,
- the formulas for estimating DQIs, and
- the procedures for documenting QC results, including control charts.

Finally, this element should describe how the QC check data will be used to determine that measurement performance is acceptable. This step can be accomplished by establishing QC “warning” and “control” limits for the statistical data generated by the QC checks (see standard QC textbooks or refer to EPA QA/G-5T for operational details). Depending on the breadth of the potential audience for reviewing and implementing the QAPP, it may be advantageous to separate the field QC from the laboratory QC requirements.

B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

B6.1 Purpose/Background The purpose of this element of the QAPP is to discuss the procedures used to verify that all instruments and equipment are maintained in sound operating condition and are capable of operating at acceptable performance levels.

B6.2 Testing, Inspection, and Maintenance

The procedures described should (1) reflect consideration of the possible effect of equipment failure on overall data quality, including timely delivery of project results; (2) address any relevant site-specific effects (e.g., environmental conditions); and (3) include procedures for assessing the equipment status. This element should address the scheduling of routine calibration and maintenance activities, the steps that will be taken to minimize instrument downtime, and the prescribed corrective action procedures for addressing unacceptable inspection or assessment results. This element should also include periodic maintenance procedures and describe the availability of spare parts and how an inventory of these parts is monitored and maintained. The reader should be supplied with sufficient information to review the adequacy of the instrument/equipment management program. Appending SOPs containing this information to the QAPP and referencing the SOPs in the text are acceptable. Inspection and testing procedures may employ reference materials, such as the National Institute of Standards and Technology’s (NIST’s) Standard Reference Materials (SRMs), as well as QC standards or an equipment certification program. The accuracy of calibration standards is important because all data will be measured in reference to the standard used. The types of standards or special programs should be noted in this element, including the inspection and acceptance testing criteria for all components. The acceptance limits for verifying the accuracy of all working standards against primary grade standards should also be provided.

B7 INSTRUMENT CALIBRATION AND FREQUENCY

THIS SECTION WILL BE VERY DETAILED OR VERY BRIEF DEPENDING UPON THE COMPLEXITY OF THE INSTRUMENTS/METHODS AND WHETHER THEY ARE BEING USED IN THE FIELD OR BY A FIXED LAB. MOST OF THIS INFORMATION CAN BE REFERENCED TO LAB AND/OR INSTRUMENT MANUFACTURER’S RECOMMENDATIONS.

THIS IS THE END OF EPA REGION 10 SPECIFIC REQUIREMENTS/FORMATS FOR SUPERFUND PROJECTS.

B7.1 Purpose/Background

This element of the QAPP concerns the calibration procedures that will be used for instrumental analytical methods and other measurement methods that are used in environmental measurements. It is necessary to distinguish between defining calibration as the checking of physical measurements against accepted standards and as determining the relationship (function) of the response versus the concentration. The American Chemical Society (ACS) limits the definition of the term calibration to the checking of physical measurements against accepted standards, and uses the term standardization to describe the determination of the response function.

B7.2 Identify the Instrumentation Requiring Calibration

The QAPP should identify any equipment or instrumentation that requires calibration to maintain acceptable performance. While the primary focus of this element is on instruments of the measurement system (sampling and measurement equipment), all methods require standardization to determine the relationship between response and concentration.

B7.3 Document the Calibration Method that Will Be Used for Each Instrument

The QAPP must describe the calibration method for each instrument in enough detail for another researcher to duplicate the calibration method. It may reference external documents such as EPA-designated calibration procedures or SOPs providing that these documents can be easily obtained. Nonstandard calibration methods or modified standard calibration methods should be fully documented and justified.

Some instrumentation may be calibrated against other instrumentation or apparatus (e.g., NIST thermometer), while other instruments are calibrated using standard materials traceable to national reference standards. QAPP documentation for calibration apparatus and calibration standards are addressed in B7.4 and B7.5.

Calibrations normally involve challenging the measurement system or a component of the measurement system at a number of different levels over its operating range. The calibration may cover a narrower range if accuracy in that range is critical, given the end use of the data. Single-point calibrations are of limited use, and two-point calibrations do not provide information on nonlinearity. If single- or two-point calibrations are used for critical measurements, the potential shortcomings should be carefully considered and discussed in the QAPP. Most EPA-approved analytical methods require multipoint (three or more) calibrations that include zeros, or blanks, and higher levels so that unknowns fall within the calibration range and are bracketed by calibration points. The number of calibration points, the calibration range, and any replication (repeated measures at each level) should be given in the QAPP. The QAPP should describe how calibration data will be analyzed. The use of statistical QC techniques to process data across multiple calibrations to detect gradual degradations in the measurement system should be described. The QAPP should describe any corrective action that will be taken if calibration (or calibration check) data fail to meet the acceptance criteria, including recalibration. References to appended SOPs containing the calibration procedures are an acceptable alternative to describing the calibration procedures within the text of the QAPP.

B7.4 Document the Calibration Apparatus

Some instruments are calibrated using calibration apparatus rather than calibration standards. For example, an ozone generator is part of a system used to calibrate continuous ozone monitors. Commercially available calibration apparatus should be listed together with the make (the manufacturer's name), the model number, and the specific variable control settings that will be used during the calibrations. A calibration apparatus that is not commercially available should be described in enough detail for another researcher to duplicate the apparatus and follow the calibration procedure.

B7.5 Document the Calibration Standards

Most measurement systems are calibrated by processing materials that are of known and stable composition. References describing these calibration standards should be included in the QAPP. Calibration standards are normally traceable to national reference standards, and the traceability protocol should be discussed. If the standards are not traceable, the QAPP must include a detailed description of how the standards will be prepared. Any method used to verify the certified value of the standard independently should be described.

B7.6 Document Calibration Frequency

The QAPP must describe how often each measurement method will be calibrated. It is desirable that the calibration frequency be related to any known temporal variability (i.e., drift) of the measurement system. The calibration procedure may involve less-frequent comprehensive calibrations and more-frequent simple drift checks. The location of the record of calibration frequency and maintenance should be referenced.

B8 INSPECTION/ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND CONSUMABLES

B8.1 Purpose

The purpose of this element is to establish and document a system for inspecting and accepting all supplies and consumables that may directly or indirectly affect the quality of the project or task. If these requirements have been included under another section, it is sufficient to provide a reference.

B8.2 Identification of Critical Supplies and Consumables

Clearly identify and document all supplies and consumables that may directly or indirectly affect the quality of the project or task. See Figures 9 and 10 for example documentation of inspection/acceptance testing requirements. Typical examples include sample bottles, calibration gases, reagents, hoses, materials for decontamination activities, deionized water, and potable water. For each item identified, document the inspection or acceptance testing requirements or specifications (e.g., concentration, purity, cell viability, activity, or source of procurement) in addition to any requirements for certificates of purity or analysis.

B8.3 Establishing Acceptance Criteria

Acceptance criteria must be consistent with overall project technical and quality criteria (e.g., concentration must be within ± 2.5%, cell viability must be >90%). If special requirements are needed for particular supplies or consumables, a clear agreement should be established with the supplier, including the methods used for evaluation and the provisions for settling disparities.

B8.4 Inspection or Acceptance Testing Requirements and Procedures

Inspections or acceptance testing should be documented, including procedures to be followed, individuals responsible, and frequency of evaluation. In addition, handling and storage conditions for supplies and consumables should be documented.

B8.5 Tracking and Quality Verification of Supplies and Consumables

Procedures should be established to ensure that inspections or acceptance testing of supplies and consumables are adequately documented by permanent, dated, and signed records or logs that uniquely identify the critical supplies or consumables, the date received, the date tested, the date to be retested (if applicable), and the expiration date. These records should be kept by the responsible individual(s) (see Figure 11 for an example log). In order to track supplies and consumables, labels with the information on receipt and testing should be used. These or similar procedures should be established to enable project personnel to

(1) verify, prior to use, that critical supplies and consumables meet specified project or task quality objectives; and

(2) ensure that supplies and consumables that have not been tested, have expired, or do not meet acceptance criteria are not used for the project or task.

B9 DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS)

B9.1 Purpose/Background

This element of the QAPP should clearly identify the intended sources of previously collected data and other information that will be used in this project. Information that is non-representative and possibly biased and is used uncritically may lead to decision errors. The care and skepticism applied to the generation of new data are also appropriate to the use of previously compiled data (for example, data sources such as handbooks and computerized databases).

B9.2 Acquisition of Non-Direct Measurement Data

This element's criteria should be developed to support the objectives of element A7. Acceptance criteria for each collection of data being considered for use in this project should be explicitly stated, especially with respect to:

• Representativeness. Were the data collected from a population that is sufficiently similar to the population of interest and the population boundaries? How will potentially confounding effects (for example, season, time of day, and cell type) be addressed so that these effects do not unduly alter the summary information?

• Bias. Are there characteristics of the data set that would shift the conclusions. For example, has bias in analysis results been documented? Is there sufficient information to estimate and correct bias?

• Precision. How is the spread in the results estimated? Does the estimate of variability indicate that it is sufficiently small to meet the objectives of this project as stated in element A7? See also Appendix D.

• Qualifiers. Are the data evaluated in a manner that permits logical decisions on whether or not the data are applicable to the current project? Is the system of qualifying or flagging data adequately documented to allow the combination of data sets?

• Summarization. Is the data summarization process clear and sufficiently consistent with the goals of this project? (See element D2 for further discussion.) Ideally, observations and transformation equations are available so that their assumptions can be evaluated against the objectives of the current project.

This element should also include a discussion on limitations on the use of the data and the nature of the uncertainty of the data.

B10 DATA MANAGEMENT

B10.1 Purpose/Background

This element should present an overview of all mathematical operations and analyses performed on raw ("as-collected") data to change their form of expression, location, quantity, or dimensionality. These operations include data recording, validation, transformation, transmittal, reduction, analysis, management, storage, and retrieval. A diagram that illustrates the source(s) of the data, the processing steps, the intermediate and final data files, and the reports produced may be helpful, particularly when there are multiple data sources and data files. When appropriate, the data values should be subjected to the same chain-of-custody requirements as outlined in element B3. Appendix G has further details.

B10.2 Data Recording

Any internal checks (including verification and validation checks) that will be used to ensure data quality during data encoding in the data entry process should be identified together with the mechanism for detailing and correcting recording errors. Examples of data entry forms and checklists should be included. B10.3 Data Validation

The details of the process of data validation and prespecified criteria should be documented in this element of the QAPP. This element should address how the method, instrument, or system performs the function it is intended to consistently, reliably, and accurately in generating the data. Part D of this document addresses the overall project data validation, which is performed after the project has been completed.

B10.4 Data Transformation

Data transformation is the conversion of individual data point values into related values or possibly symbols using conversion formulas (e.g., units conversion or logarithmic conversion) or a system for replacement. The transformations can be reversible (e.g., as in the conversion of data points using a formulas) or irreversible (e.g., when a symbol replaces actual values and the value is lost). The procedures for all data transformations should be described and recorded in this element. The procedure for converting calibration readings into an equation that will be applied to measurement readings should be documented in the QAPP. Transformation and aberration of data for statistical analysis should be outlined in element D3, “Reconciliation with Data Quality Objectives.”

B10.5 Data Transmittal

Data transmittal occurs when data are transferred from one person or location to another or when data are copied from one form to another. Some examples of data transmittal are copying raw data from a notebook onto a data entry form for keying into a computer file and electronic transfer of data over a telephone or computer network. The QAPP should describe each data transfer step and the procedures that will be used to characterize data transmittal error rates and to minimize information loss in the transmittal.

B10.6 Data Reduction

Data reduction includes all processes that change the number of data items. This process is distinct from data transformation in that it entails an irreversible reduction in the size of the data set and an associated loss of detail. For manual calculations, the QAPP should include an example in which typical raw data are reduced. For automated data processing, the QAPP should clearly indicate how the raw data are to be reduced with a well-defined audit trail, and reference to the specific software documentation should be provided.

B10.7 Data Analysis

Data analysis sometimes involves comparing suitably reduced data with a conceptual model (e.g., a dispersion model or an infectivity model). It frequently includes computation of summary statistics, standard errors, confidence intervals, tests of hypotheses relative to model parameters, and goodness-of-fit tests. This element should briefly outline the proposed methodology for data analysis and a more detailed discussion should be included in the final report.

B10.8 Data Tracking

Data management includes tracking the status of data as they are collected, transmitted, and processed. The QAPP should describe the established procedures for tracking the flow of data through the data processing system.

B10.9 Data Storage and Retrieval

The QAPP should discuss data storage and retrieval including security and time of retention, and it should document the complete control system. The QAPP should also discuss the performance requirements of the data processing system, including provisions for the batch processing schedule and the data storage facilities.

C ASSESSMENT/OVERSIGHT

C1 ASSESSMENTS AND RESPONSE ACTIONS

C1.1 Purpose/Background

During the planning process, many options for sampling design (see EPA QA/G-5S, Guidance on Sampling Design to Support QAPPs), sample handling, sample cleanup and analysis, and data reduction are evaluated and chosen for the project. In order to ensure that the data collection is conducted as planned, a process of evaluation and validation is necessary. This element of the QAPP describes the internal and external checks necessary to ensure that:

• all elements of the QAPP are correctly implemented as prescribed,

• the quality of the data generated by implementation of the QAPP is adequate, and • corrective actions, when needed, are implemented in a timely manner and their effectiveness is confirmed.

Although any external assessments that are planned should be described in the QAPP, the most important part of this element is documenting all planned internal assessments. Generally, internal assessments are initiated or performed by the internal QA Officer so the activities described in this element should be related to the responsibilities of the QA Officer as discussed in Section A4.

C1.2 Assessment Activities and Project Planning

The following is a description of various types of assessment activities available to managers in evaluating the effectiveness of environmental program implementation.

C1.2.1 Assessment of the Subsidiary Organizations

A. Management Systems Review (MSR). A form of management assessment, this process is a qualitative assessment of a data collection operation or organization to establish whether the prevailing quality management structure, policies, practices, and procedures are adequate for ensuring that the type and quality of data needed are obtained. The MSR is used to ensure that sufficient management controls are in place and carried out by the organization to adequately plan, implement, and assess the results of the project. See the Guidance for the Management Systems Review Process (EPA QA/G-3).

B. Readiness reviews. A readiness review is a technical check to determine if all components of the project are in place so that work can commence on a specific phase.

C1.2.2 Assessment of Project Activities

A. Surveillance. Surveillance is the continual or frequent monitoring of the status of a project and the analysis of records to ensure that specified requirements are being fulfilled.

B. Technical Systems Audit (TSA). A TSA is a thorough and systematic onsite qualitative audit, where facilities, equipment, personnel, training, procedures, and record keeping are examined for conformance to the QAPP. The TSA is a powerful audit tool with broad coverage that may reveal weaknesses in the management structure, policy, practices, or procedures. The TSA is ideally conducted after work has commenced, but before it has progressed very far, thus giving opportunity for corrective action.

C. Performance Evaluation (PE). A PE is a type of audit in which the quantitative data generated by the measurement system are obtained independently and compared with routinely obtained data to evaluate the proficiency of an analyst or laboratory. "Blind" PE samples are those whose identity is unknown to those operating the measurement system. Blind PEs often produce better performance assessments because they are handled routinely and are not given the special treatment that undisguised PEs sometimes receive. The QAPP should list the PEs that are planned, identifying:

• the constituents to be measured,

• the target concentration ranges,

• the timing/schedule for PE sample analysis, and

• the aspect of measurement quality to be assessed (e.g., bias, precision, and detection limit).

A number of EPA regulations and EPA-sanctioned methods require the successful accomplishment of PEs before the results of the test can be considered valid. PE materials are now available from commercial sources and a number of EPA Program Offices coordinate various interlaboratory studies and laboratory proficiency programs. Participation in these or in the National Voluntary Laboratory Accreditation Program (NVLAP, run by NIST) should be mentioned in the QAPP.

D. Audit of Data Quality (ADQ). An ADQ reveals how the data were handled, what judgments were made, and whether uncorrected mistakes were made. Performed prior to producing a project’s final report, ADQs can often identify the means to correct systematic data reduction errors.

E. Peer review. Peer review is not a TSA, nor strictly an internal QA function, as it may encompass non-QA aspects of a project and is primarily designed for scientific review. Whether a planning team chooses ADQs or peer reviews depends upon the nature of the project, the intended use of the data, the policies established by the sponsor of the project, and overall the conformance to the Program Office or Region’s peer-review policies and procedures. Reviewers are chosen who have technical expertise comparable to the project’s performers but who are independent of the project. ADQs and peer reviews ensure that the project activities:

• were technically adequate,

• were competently performed,

• were properly documented,

• satisfied established technical requirements, and

• satisfied established QA requirements.

In addition, peer reviews assess the assumptions, calculations, extrapolations, alternative interpretations, methods, acceptance criteria, and conclusions documented in the project’s report. Any plans for peer review should conform with the Agency’s peer-review policy and guidance. The names, titles, and positions of the peer reviewers should be included in the final QAPP, as should their report findings, the QAPP authors’ documented responses to their findings, and reference to where responses to peer-review comments may be located, if necessary.

F. Data Quality Assessment (DQA). DQA involves the application of statistical tools to determine whether the data meet the assumptions that the DQOs and data collection design were developed under and whether the total error in the data is tolerable. Guidance for the Data Quality Assessment Process (EPA QA/G-9) provides nonmandatory guidance for planning, implementing, and evaluating retrospective assessments of the quality of the results from environmental data operations.

C1.3 Documentation of Assessments

The following material describes what should be documented in a QAPP after consideration of the above issues and types of assessments. C1.3.1 Number, Frequency, and Types of Assessments Depending upon the nature of the project, there may be more than one assessment. A schedule of the number, frequencies, and types of assessments required should be given.

C1.3.2 Assessment Personnel

The QAPP should specify the individuals, or at least the specific organizational units, who will perform the assessments. Internal audits are usually performed by personnel who work for the organization performing the project work but who are organizationally independent of the management of the project. External audits are performed by personnel of organizations not connected with the project but who are technically qualified and who understand the QA requirements of the project.

C1.3.3 Schedule of Assessment Activities

A schedule of audit activities, together with relevant criteria for assessment, should be given to the extent that it is known in advance of project activities.

Audits, peer reviews, and other assessments often reveal findings of practice or procedure that do not conform to the written QAPP. Because these issues must be addressed in a timely manner, the protocol for resolving them should be given here together with the proposed actions to ensure that the corrective actions were performed effectively. The person to whom the concerns should be addressed, the decision making hierarchy, the schedule and format for oral and written reports, and the responsibility for corrective action should all be discussed in this element. It also should explicitly define the unsatisfactory conditions upon which the assessors are authorized to act and list the project personnel who should receive assessment reports.

C2 REPORTS TO MANAGEMENT

C2.1 Purpose/Background

Effective communication between all personnel is an integral part of a quality system. Planned reports provide a structure for apprising management of the project schedule, the deviations from approved QA and test plans, the impact of these deviations on data quality, and the potential uncertainties in decisions based on the data. Verbal communication on deviations from QA plans should be noted in summary form in element D1 of the QAPP.

C2.2 Frequency, Content, and Distribution of Reports

The QAPP should indicate the frequency, content, and distribution of the reports so that management may anticipate events and move to ameliorate potentially adverse results. An important benefit of the status reports is the opportunity to alert the management of data quality problems, propose viable solutions, and procure additional resources. If program assessment (including the evaluation of the technical systems, the measurement of performance, and the assessment of data) is not conducted on a continual basis, the integrity of the data generated in the program may not meet the quality requirements. These audit reports, submitted in a timely manner, will provide an opportunity to implement corrective actions when most appropriate.

C2.3 Identify Responsible Organizations

It is important that the QAPP identify the personnel responsible for preparing the reports, evaluating their impact, and implementing follow-up actions. It is necessary to understand how any changes made in one area or procedure may affect another part of the project. Furthermore, the documentation for all changes should be maintained and included in the reports to management. At the end of a project, a report documenting the Data Quality Assessment findings to management should be prepared.

D DATA VALIDATION AND USABILITY

D1 DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

D1.1 Purpose/Background

The purpose of this element is to state the criteria for deciding the degree to which each data item has met its quality specifications as described in Group B. Investigators should estimate the potential effect that each deviation from a QAPP may have on the usability of the associated data item, its contribution to the quality of the reduced and analyzed data, and its effect on the decision. The process of data verification requires confirmation by examination or provision of objective evidence that the requirements of these specified QC acceptance criteria are met. In design and development, verification concerns the process of examining the result of a given activity to determine conformance to the stated requirements for that activity. For example, have the data been collected according to a specified method and have the collected data been faithfully recorded and transmitted? Do the data fulfill specified data format and metadata requirements. The process of data verification effectively ensures the accuracy of data using validated methods and protocols and is often based on comparison with reference standards.

The process of data validation requires confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use have been fulfilled. In design and development, validation concerns the process of examining a product or result to determine conformance to user needs. For example, have the data and assessment methodology passed a peer review to evaluate the adequacy of their accuracy and precision in assessing progress towards meeting the specific commitment articulated in the objective or subobjective. The method validation process effectively develops the QC acceptance criteria or specific performance criteria.

Each of the following areas of discussion should be included in the QAPP elements. The discussion applies to situations in which a sample is separated from its native environment and transported to a laboratory for analysis and data generation. However, these principles can be adapted to other situations (for example, in-situ analysis or laboratory research).

D1.2 Sampling Design

How closely a measurement represents the actual environment at a given time and location is a complex issue that is considered during development of element B1. See Guidance on Sampling Designs to Support QAPPs (EPA QA/G-5S).

Acceptable tolerances for each critical sample coordinate and the action to be taken if the tolerances are exceeded should be specified in element B1. Each sample should be checked for conformity to the specifications, including type and location (spatial and temporal). By noting the deviations in sufficient detail, subsequent data users will be able to determine the data's usability under scenarios different from those included in project planning. The strength of conclusions that can be drawn from data (see Guidance Document for Data Quality Assessment, EPA QA/G-9) has a direct connection to the sampling design and deviations from that design. Where auxiliary variables are included in the overall data collection effort (for example, microbiological nutrient characteristics or process conditions), they should be included in this evaluation.

D1.3 Sample Collection Procedures

Details of how a sample is separated from its native time/space location are important for properly interpreting the measurement results. Element B2 provides these details, which include sampling and ancillary equipment and procedures (including equipment decontamination). Acceptable departures (for example, alternate equipment) from the QAPP, and the action to be taken if the requirements cannot be satisfied, should be specified for each critical aspect. Validation activities should note potentially unacceptable departures from the QAPP. Comments from field surveillance on deviations from written sampling plans also should be noted.

D1.4 Sample Handling

Details of how a sample is physically treated and handled during relocation from its original site to the actual measurement site are extremely important. Correct interpretation of the subsequent measurement results requires that deviations from element B3 of the QAPP and the actions taken to minimize or control the changes, be detailed. Data collection activities should indicate events that occur during sample handling that may affect the integrity of the samples.

At a minimum, investigators should evaluate the sample containers and the preservation methods used and ensure that they are appropriate to the nature of the sample and the type of data generated from the sample. Checks on the identity of the sample (e.g., proper labeling and chain-of-custody records) as well as proper physical/chemical storage conditions (e.g., chain-of-custody and storage records) should be made to ensure that the sample continues to be representative of its native environment as it moves through the analytical process.

D1.5 Analytical Procedures

Each sample should be verified to ensure that the procedures used to generate the data (as identified in element B4 of the QAPP) were implemented as specified. Acceptance criteria should be developed for important components of the procedures, along with suitable codes for characterizing each sample's deviation from the procedure. Data validation activities should determine how seriously a sample deviated beyond the acceptable limit so that the potential effects of the deviation can be evaluated during DQA.

D1.6 Quality Control

Element B5 of the QAPP specifies the QC checks that are to be performed during sample collection, handling, and analysis. These include analyses of check standards, blanks, spikes, and replicates, which provide indications of the quality of data being produced by specified components of the measurement process. For each specified QC check, the procedure, acceptance criteria, and corrective action (and changes) should be specified. Data validation should document the corrective actions that were taken, which samples were affected, and the potential effect of the actions on the validity of the data.

D1.7 Calibration

Element B7 addresses the calibration of instruments and equipment and the information that should be presented to ensure that the calibrations:

• were performed within an acceptable time prior to generation of measurement data;

• were performed in the proper sequence;

• included the proper number of calibration points;

• were performed using standards that “bracketed” the range of reported measurement results (otherwise, results falling outside the calibration range are flagged as such); and

• had acceptable linearity checks and other checks to ensure that the measurement system was stable when the calibration was performed.

When calibration problems are identified, any data produced between the suspect calibration event and any subsequent recalibration should be flagged to alert data users.

D1.8 Data Reduction and Processing

Checks on data integrity evaluate the accuracy of “raw” data and include the comparison of important events and the duplicate rekeying of data to identify data entry errors. Data reduction is an irreversible process that involves a loss of detail in the data and may involve averaging across time (for example, hourly or daily averages) or space (for example, compositing results from samples thought to be physically equivalent). Since this summarizing process produces few values to represent a group of many data points, its validity should be well-documented in the QAPP. Potential data anomalies can be investigated by simple statistical analyses (see Guidance for Data Quality Assessment, EPA QA/G-9).

The information generation step involves the synthesis of the results of previous operations and the construction of tables and charts suitable for use in reports. How information generation is checked, the requirements for the outcome, and how deviations from the requirements will be treated, should be addressed in this element.

D2 VALIDATION AND VERIFICATION METHODS

D2.1 Purpose/Background

The purpose of this element is to describe, in detail, the process for validating (determining if data satisfy QAPP-defined user requirements) and verifying (ensuring that conclusions can be correctly drawn) project data. The amount of data validated is directly related to the DQOs developed for the project. The percentage validated for the specific project together with its rationale should be outlined or referenced. The QAPP should have a clear definition of what is implied by “verification” and “validation.”

D2.2 Describe the Process for Validating and Verifying Data

The individuals responsible for data validation together with the lines of authority should be shown on an organizational chart and may be indicated in the chart in element A7. The chart should indicate who is responsible for each activity of the overall validation and verification processes. The data to be validated should be compared to “actual” events using the criteria documented in the QAPP. The data validation procedure for all environmental measurements should be documented in the SOPs for specific data validation. Verification and validation issues are discussed at length in Guidance on Environmental Verification and Validation, (EPA QA/G-8).

D3 RECONCILIATION WITH DATA QUALITY OBJECTIVES

D3.1 Purpose/Background

The purpose of element D3 is to outline and specify, if possible, the acceptable methods for evaluating the results obtained from the project. This element includes scientific and statistical evaluations of data to determine if the data are of the right type, quantity, and quality to support their intended use.

D3.2 Reconciling Results with DQOs

The DQA process has been developed for cases where formal DQOs have been established. Guidance for Data Quality Assessment (EPA QA/G-9) focuses on evaluating data for fitness in decision making and also provides many graphical and statistical tools. DQA is a key part of the assessment phase of the data life cycle, as shown in Figure 1. As the part of the assessment phase that follows data validation and verification, DQA determines how well the validated data can support their intended use. If an approach other than DQA has been selected, an outline of the proposed activities should be included.

APPENDIX F

Region 10's Generic Quality Assurance Project Plans

GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR

SAMPLING AT RCRA FACILITIES

Date: April 2001
Revision: 1.3

APPROVAL OF QAPP:

______________________________ ______________________
Rick Albright, Director **Date**
Waste and Chemicals Management Office

______________________________ ______________________
Barry W. Towns, Manager **Date**
QA and Data Unit, OEA

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1.0 Project Management Elements

1.1 Distribution List

Copies of the completed/signed project plan should be distributed to:

RCRA Compliance Officer (RCO)RCRA Inspector	Specify correct MailStop
RSCC	OEA-095
QA Officer	OEA-095
Laboratory Supervisory Chemist	LAB

Electronic copies of data are not required unless specifically requested.

1.2 Project/ Task Organization

The following is a list of key project personnel and their responsibilities:

RCRA Inspector/Project Manager (RI)	
RCRA Compliance Officer (RCO):	
QA Officer:	Barry Towns (206) 553-1675
RSCC:	Laura Castrilli (206) 553-4323
Laboratory:	Joe Blazevich (360) 871-8705

The RI is responsible for planning, sampling design, conducting the inspection, collecting physical and docum samples, analysis coordination, and preparing the inspection report. In the event of non-compliant results, an l be assigned to the case. The RI works with the RCO and members of the Region 10 Office of Regional Counc resolve non-compliant conditions at a Facility.

The QA Office assists the RI and RCO in the development of the Site Specific QA Project Plans (QAPPs). Th Office also reviews and approves site specific sampling plans, its subsequent revisions and amendments.

The Regional Sample Control Coordinator (RSCC) resides in the QA Office, coordinates sample analyses per by Manchester Environmental Laboratory (MEL). The RI submits the RCRA Site Specific Inspection Plan (R the RSCC and the QAO. The QAO reviews the RSSIP. The RSCC informs the laboratory of the upcoming sa from the inspection and reserves laboratory space for the RSSIP submitted. The RSCC also provides samplers/inspectors with regional sample tracking numbers, custody seals and chain of custody forms.

The Laboratory (MEL) is responsible for conducting fixed laboratory analyses identified in Table 1 of the RS accordance with the requirements specified in the QAPP and the analytical methods. The supervisory chemist technical lead at the laboratory responsible for assigning the appropriate personnel to the project. The laborat also responsible for validating laboratory generated data prior to submission to RI.

1.3 Problem Definition/ Background

1.3.1 Background

In support of the goals of the Resource Conservation and Recovery Act (RCRA) Enforcement Program, comp monitoring is performed on an annual or on "as needed" basis by either EPA or authorized State representative federal or state operated facilities. Gathering data for compliance monitoring data is done through facility ins There are six types of inspections conducted under the RCRA program, namely: (1) compliance evaluation ins (2) case development inspection, (3) comprehensive ground water monitoring evaluation, (4) compliance sam inspection, (5) operations and maintenance inspection and (6) laboratory audit. During facility inspections, s may be collected for analysis to characterize a chemical waste, to verify the constituents of a hazardous waste generally, to gather data to support an enforcement action when significant RCRA violations are known, suspe revealed.

This QAPP is prepared with an intent to assist and provide field personnel and inspectors from the Office of W Chemical Management, Office of Environmental Assessment and Region 10 State Offices with basic guidelir collection of samples, proper sample documentation and the use of correct sampling and analytical methodolo verify and determine the compliance of a hazardous waste handler during facility inspections. Samples collec sent to MEL in Port Orchard, WA or to any State accredited laboratory for analysis. This document was prepa compliance with the EPA Order 5360.1 CHG 1 and the Agency required G5 format, "EPA Requirements for C Assurance Project Plans", Final Version: March, 2001, and the "USEPA Region 10 Expanded Guidance for Pr Quality Assurance Project Plans", Revision 1.0 dated 12/7/98.

1.3.2 Objectives/Scope

- Conduct RCRA Permit Compliance inspections and obtain samples of opportunity from the RCRA fac whose name, address and phone number are specified in the RSSIP submitted by RI.

- Determine compliance with the existing or potential new permit limitations. Specific parameters are l Table 1 and the sample collection/design rationale section.

1.4 Project/ Task Description and Schedule

1.4.1 Project/Task Description

This Generic QA Project Plan is developed for the purpose of supporting announced and unannounced samplir activities that may be performed in conjunction with RCRA facility inspection. The samples may be analyzed or any other State accredited laboratory for TCLP iorganic and organic compounds, flash point, Polycyclic Ar Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH) and pH. The specific compounds of concerns f facility inspected will be specified in Table 1 - Data Quality Objectives Summary of the RSSIP. If possible, measurements for pH will be taken at the facility. See the sample collection section and the specific analyses be performed.

1.4.2 Schedule of Tasks

Activity	Estimated Start Date	Estimated Completion Date	Comments
RCRA Site-Specific QAPP Review/Approval		1-2 working days from receipt of 2-page Site-Specific Inspection Plan*	
Mobilize to Site	See RSSIP		
Sample Collection			
Laboratory Receipt of Samples			
Laboratory Analysis		5 weeks from sample receipt	
Data Validation		2 weeks from data receipt	
Target Completion Date	See RSSIP		

1.4.3 RCRA Site-Specific Inspection Plan (RSSIP)

The RCRA Site-Specific Inspection Plan (RSSIP) is a three page summary of the sampling activities requirem may be conducted during facility inspection. The RSSIP is submitted to the QA Office for (1) review and appr (2) for laboratory coordination and scheduling. The first page of RSSIP specifies the type of inspection that w performed, the facility name, address, contact person and phone number, the names of inspectors conducting t inspection and their respective environmental organization affiliations and the tentative activity schedule of th Page 1 of RSSIP also contains other important information concerning the facility which may be helpful in ma decisions about the parameters needed for analysis . The second page of RSSIP is for the RSCC, laboratory ar QAO's use. This page has the project and account code and the EPA sample numbers assigned for inspection. page contains the list of parameters that the laboratory agreed to perform in accordance with the activity schec the methods and DQOs specified in Table I of the RSSIP. This page also contains the QA reviewer's concurre with the submitted RSSIP. Page three of the RSSIP consists of a Table summarizing the analytical requiremer inspection, the estimated number of samples that will be collected, the suite of parameters required for analys analytical procedure and methodologies that will be used and the DQO requirements of the inspection which a by the RI. If applicable, Attachment I- Sample Alteration Form and Attachment II- Corrective Action Form, m be included with the RSSIP. The RSSIP is submitted to the QA Office for review and approval before a schedu sampling event or immediately after collecting samples of opportunity. A blank 3-page RSSIP is attached at tl this Generic QAPP.

1.5 Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms inspectors and project managers use describe how good the data needs to be in order to meet the project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, compar and measurement range. The overall QA objective for analytical data is to ensure that data of known and accep quality are provided. To achieve this goal, data must be reviewed for 1) representativeness, 2) comparability, 3 precision, 4) accuracy (or bias), and 5) completeness. Precision, accuracy, completeness, sample representat and data comparability are necessary attributes to ensure that analytical data are reliable, scientifically sound, a defensible. Each analytical result or set of results generated should be fully defensible in any legal action, wh administrative, civil or criminal.

Precision: Field precision is measured by collecting field duplicate samples at a frequency of specified in RS each matrix collected and measured, and for each inspection event. Laboratory precision and accuracy can be measured by the laboratory measuring Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples and the analy laboratory duplicate samples. The laboratory usually performs the analysis of one set of MS/MSD and duplic samples per matrix measured or at a frequency specified in the RSSIP. Field and analytical precision will be e by the relative percent difference (RPD) between field duplicate samples, laboratory duplicate samples; labor accuracy and precision will be determined by the spike recoveries and the RPDs of the MS/MSD samples, respectively.

$$RPD = \frac{ABS(R1 - R2)}{((R1 + R2)/2)} \times 100$$

R1 = Recovery for MS or duplicate 1
R2 = Recovery for MSD or duplicate 2

Accuracy: Accuracy will be evaluated by the use percent recovery (%R) of the target analyte in spiked sample also the recoveries of the surrogates in all samples and QC samples.

$$\%\ Recovery = \frac{SQ - NQ}{S} \times 100$$

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

Representativeness is the degree to which data from the project accurately represent a particular characteristi environmental matrix which is being tested. Representativeness of samples is ensured by adherence to standa sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of sam should provide a representativeness of each matrix or product of the chemical processes being sampled.

Comparability is the measurement of the confidence in comparing the results of one experiment with the resu
different experiments using the same matrix, sample location, sampling techniques and analytical methodolog
comparability of the measurement results from these different experiments should be 85% or greater.

Completeness: Completeness is the percentage of valid results obtained compared to the total number of sam
taken for a parameter. Since sampling from inspections are usually grab and limited in number of samples, the
of valid results obtained from the analyses are expected to be equal or better than 85%. %Completeness may b
calculated using the following formula:

$$\% \text{ Completeness} = \frac{\#\text{ of valid results}}{\#\text{ of samples taken}}$$

The QA objectives outlined, above, will be evaluated in conjunction with the data validation process.

1.6 Special Training Requirements/ Certification

Inspectors are required to complete the 40-hour Basic Health and Safety training and/or Hazardous Materials
Response Course. The inspectors will have respiratory fit testing and basic health and safety training certifica
the training which should be maintained current by attending an 8-hour safety training refresher course every y
the basic training. The inspectors must also have a signed and current “credential” certifying the bearer as “Au
to Conduct Investigations and Inspections Pursuant to All Federal Laws Administered by the United States Environmental Protection Agency”. Other courses that the inspectors are required to attend are (1) the Basic Inspector/Investigator Training and (2) Sampling of Hazardous Materials (165.4) . All of the training courses
above are provided by EPA Region X. Furthermore, sampling and sample documentation skills are also assur
the “mentoring” provided by the senior inspectors in the field.

Chemists performing the analytical work for this project have extensive knowledge and skill in the execution o
analytical methods being requested.

1.7 Documentation and Records

Complete documentation for inspections will include at least some of the following forms to be completed a
by the RI:

Investigation Summary
Records Inspection Checklist
Chain of Custody Logs
Record of Sampling
Inspector Inspection/Investigation Report Summary
Laboratory Analysis Reports
Photographs, Paper Copies, Chemical Labels, MSDS, Application Records or other documentation.
Correspondence with affected/involved parties, agencies or others.

Investigators will maintain field notes in a bound notebook and all documents, records, and data collected will in a case file and submitted to the program office with the final inspection report.

The following documents will be archived at the Manchester Environmental Laboratory: (1) signed hard copie sampling and chain-of-custody records (2) electronic and hard copy of analytical data including extraction an preparation bench sheets, raw data and reduced analytical data.

The laboratory will store all sample receipt, sample login, extraction documentation, and laboratory instrumen documentation per SOP.

2.0 Measurement/ Data Acquisition

2.1 Sampling Process Design (Experimental Design)

Prior to compliance inspections, the RI will review and evaluate facility files, if available, which may include background information, historical ownership and use of the facility for waste generation, treatment, storage c of solid and hazardous wastes, facility maps depicting general geographic location, property lines, surrounding uses, all production and groundwater monitoring wells, any injection well onsite or nearby, a summary of all p source areas of contamination, a summary of past permits requested and/or received, any enforcement actions subsequent responses and a list of documents and studies prepared for the facility, records and inspection rep previous compliance site visits.

Based on the monitoring data on hand and visual inspection of the facility, the inspectors will collect samples opportunity on an “as needed” basis to characterize or verify the chemical constituents of the waste generatec or disposed from the facility.

Most of the time, during facility inspections, samples may be collected for analysis to characterize a chemica verify the constituents of a hazardous waste and generally to gather data to support an <u>enforcement action whe significant RCRA violations are known, suspected or revealed</u> in the form of a citizen tip or complaint against facility.

2.2 Sampling Methods Requirements

The RCO and RI shall adhere to the technical guidance and requirements of the one or more of the following documents for sample collection during RCRA inspections:

- US EPA. 1998. SW 846, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods .
- USEPA. Region 4, May, 1996. Environmental Investigations Standard Operating Procedures and Quali Assurance Manual
- USEPA. August, 1987. Compendium of Field Operations Methods. EPA/549/P-87/001A
- ODEQ. April, 1996. Oregon Department of Environmental Quality (ODEQ) Field Sampling Reference (If samples are to be submitted to ODEQ Lab for analysis.
- USEPA. November, 1991. Description and Sampling of Contaminated Soils - a Field Pocket Guide. EPA/625/12-91/002.
- USEPA. July 24, 1981. RCRA Inspection Manual. Section V. Office of Solid Waste.

All sample containers will be supplied by the EPA Manchester Laboratory. EPA has verification that the cont certified pre-cleaned quality.

Individual sample containers will be stored in a cooler and shipped with ice as the coolant. All samples will b and shipped with proper sample custody documentation. A temperature blank shall accompany each cooler.

Soil samples and/or product samples will be collected on "as needed" basis for waste characterization. The pH samples will be determined by the RI in the field using Method 9045C. Samples sent to the laboratory for To Characteristic Leaching Procedure (TCLP), will be screened for totals first. If the total amount of a paramete enough to warrant TCLP analysis, then, the samples will be extracted using the EPA's SW846 Method 1311- t subsequently analyzed for the suite of TCLP parameters listed in Table I of RSSIP. Some of the samples may require flash point determination, total petroleum hydrocarbon (TPH) and/or polynuclear aromatic hydrocarbo analyses. Details of the analyses, methods, quantitation limits, containers, preservation, volumes, and holding specified in Table 1 - Data Quality Objectives Summary attached at the end of this QAPP . All alterations or deviations from this QAPP will be documented using Attachment 1 - Sample Alteration Form.

2.3 Sample Handling and Custody Requirements

2.3.1 Sampling Procedures

See Section 2.2 of this QAPP - Sampling Method Requirements.

2.3.2 Sample Custody Procedures:

Samples will be kept in the custody of EPA and/or State personnel. Region 10 Chain of Custody procedures a forms will be used. Custody seals will be placed on all shipping containers.

2.3.3 Shipping Requirements:

Packaging, marking, labeling, and shipping of samples will comply with all regulations promulgated by the U. S Department of Transportation (DOT) in the Code of Federal Regulations, 49 CFR 171 -177 and International Transport Association (IATA) regulations. Only staff who are authorized and have received the necessary trai shipping samples can ship samples by air.

2.3.4 Decontamination Procedures:

Samples will be collected using dedicated and disposable sampling tools.

2.4 Analytical Methods Requirements

Monitoring shall be conducted in accordance with EPA approved analytical procedures and in compliance wit CFR part 261 and part 136. See Table 1 for specific methods, detection limits, etc. applicable to this project.

The compounds of concern, the project required quantitation limits, QL, (for organics), detection limits (DLs analytical methods are listed below:

Target Compounds - These target compounds were taken from the lists in 40 CFR part 261 and part 136. The estimated number of samples that will be collected for each suite of parameters should be specified in Table 1 RSSIP.

Total Petroleum Hydrocarbon (TPH) - SW846 EPA Method 8440

Flash Point/Ignitability Determination - Pensky-Martens closed cup tester method - SW846 Method 1010 or d-93-79 for liquid samples ; Method 1030 or ASTM - d-93-80 for solid samples.

Mercury - Samples collected for TCLP Mercury will be analyzed for total mercury using the Manual digestio Vapor Atomic Absorption Technique; SW846 Methods 7470A; for solid or semi-solid wastes samples- Meth 245.5 or Methods 7471B. If the values obtained are high enough to warrant TCLP analyses, the samples will b prepared using the TCLP extraction procedure Method 1311 and analyzed for mercury using the same analytic methods specified above.

TCLP Metals

Contaminant	CAS Numbers	Sample Prep Method	Analytical Method	Detection Limits (mg/L)
arsenic	7440-38-2	1311	7000/6000 or equivalent	3
barium	7440-39-3	1311	7000/6000 or equivalent	50
cadmium	7440-43-9	1311	7000/6000 or equivalent	0.5
chromium	7440-47-3	1311	7000/6000 or equivalent	3
mercury	7439-97-6	1311	7000 or equivalent	0.1
lead	7439-92-1	1311	7000/6000 or equivalent	3
selenium	7782-49-2	1311	7000/6000 or equivalent	0.5
silver	7440-22-4	1311	7000/6000 or equivalent	3

TCLP Pesticides

Contaminant	CAS Numbers	Sample Prep/ Clean-up Methods	Analytical Method	Quantitation Limits (ug/Kg)
chlordane	57-74-9	3550B/3580A 3640A/3620B	8081A	20
endrin	72-20-8	3550B/3580A 3640A/3620B	8081A	10
heptachlor	76-44-8	3550B/3580A 3640A/3620B	8081A	5
heptachlor epoxide	1024-57-3	3550B/3580A 3640A/3620B	8081A	5
hexachlorobenzene	118-74-1	3550B/3580A 3640A/3620B	8081A	100
methoxychlor	72-43-5	3550B/3580A 3640A/3620B	8081A	5000
toxaphene	8001-35-2	3550B/3580A 3640A/3620B	8081A	300

TCLP VOCs

Contaminant	CAS Numbers	Analytical Method SW846	Quantitation Limits (ug/L)
benzene	71-43-2	8260A	300
carbon tetrachloride	56-23-5	8260A	300

Contaminant	CAS Numbers	Analytical Method SW846	Quantitation Limits (ug/L)
chlorobenzene	108-90-7	8260A	5000
chloroform	67-66-3	8260A	5000
methyl ethyl ketone	78-93-3	8260A	100000
hexachlorobutadiene	87-68-3	8260A	300
hexachloroethane	67-72-1	8260A	2000
tetrachloroethene	127-18-4	8260A	500
trichloroethene	79-01-6	8260A	100
vinyl chloride	75-01-4	8260A	100
1,4-dichlorobenzene	106-46-7	8260A	5000
1,2-dichloroethane	107-06-2	8260A	300
1,1-dichloroethene	75-35-4	8260A	500

TCLP Semi-volatile Organic Compounds

Contaminant	CAS Numbers	Sample Prep/ Clean-up Methods	Analytical Method	Quantitation Limits (ug/Kg)
o-cresol	95-48-7	3550B/3580A 3640A/3630C	8270B	150000
m-cresol	108-39-4	3550B/3580A 3640A/3630C		150000
p-cresol	106-44-5	3550B/3580A 3640A/3630C	8270B	150000
cresol	----	3550B/3580A 3640A/3630C	8270B	150000
1,4-dichlorobenzene	106-46-7	3550B/3580A 3640A/3630C	8270B	5000
2,4-dinitrotoluene	121-14-2	3550B/3580A 3640A/3630C	8270B	100
hexachlorobutadiene	87-68-3	3550B/3580A 3640A/3630C	8270B	400
nitrobenzene	98-95-3	3550B/3580A 3640A/3630C	8270B	1500
pentachlorophenol	87-86-5	3550B/3580A 3640A/3630C	8270B	50000
pyridine	110-86-1	3550B/3580A 3640A/3630C	8270B	3000
2,4,5-trichlorophenol	95-95-4	3550B/3580A 3640A/3630C	8270B	300000

Contaminant	CAS Numbers	Sample Prep/ Clean-up Methods	Analytical Method	Quantitation Limits (ug/Kg)
2,4,6-trichlorophenol	88-06-2	3550B/3580A 3640A/3630C	8270B	1500

Polynuclear Aromatic Hydrocarbons (PAHs)

Contaminants	CAS Numbers	Prep/Clean-up Methods	Analytical Methods - SW846	Quantitation Limits (ug/Kg)
naphthalene	91-20-3	3550B/3580A 3640A/3630C	8270B	1000
2-methyl naphthalene	91-57-6	3550B/3580A 3640A/3630C	8270B	1000
acenaphthylene	208-96-8	3550B/3580A 3640A/3630C	8270B	1000
acenaphthene	83-32-9	3550B/3580A 3640A/3630C	8270B	1000
dibenzofuran	132-64-9	3550B/3580A 3640A/3630C	8270B	1000
fluorene	86-73-7	3550B/3580A 3640A/3630C	8270B	1000
phenenthrene	85-01-8	3550B/3580A 3640A/3630C	8270B	1000
anthracene	120-12-7	3550B/3580A 3640A/3630C	8270B	1000
flouranthene	206-44-0	3550B/3580A 3640A/3630C	8270B	1000
pyrene	129-00-0	3550B/3580A 3640A/3630C	8270B	1000
benzo(a)anthracene	56-55-3	3550B/3580A 3640A/3630C	8270B	1000
chrysene	218-01-9	3550B/3580A 3640A/3630C	8270B	1000
benzo(b)fluoranthene	205-99-2	3550B/3580A 3640A/3630C	8270B	1000
benzo(k)fluoranthene	207-08-9	3550B/3580A 3640A/3630C	8270B	1000
benzo(a)pyrene	50-32-8	3550B/3580A 3640A/3630C	8270B	1000
indeno(cd-1,2,3)pyrene	193-39-5	3550B/3580A 3640A/3630C	8270B	1000

Contaminants	**CAS Numbers**	**Prep/Clean-up Methods**	**Analytical Methods - SW846**	**Quantitation Limits (ug/Kg)**
dibenzo(a,h)anthracene	53-70-3	3550B/3580A 3640A/3630C	8270B	1000
benzo(g,h,i)perylene	191-24-2	3550B/3580A 3640A/3630C	8270B	1000

2.5 Quality Control Requirements

Quality Control procedures for analyte measurements will be according to the requirements specified in SW-

Laboratory instrumentation will be calibrated in accordance with the analytical procedure. Laboratory instrum will be maintained in accordance with the instrument manufacturer's specifications and the laboratory Standar Operating procedures (SOPs).

2.6 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The laboratory will follow their standard operating procedures for any preventative maintenance required on la instruments or systems used for this project.

2.7 Instrument Calibration and Frequency

Field maintenance and calibration will be performed where appropriate prior to use of the instruments. The pl shall be calibrated according to the manufacturer's specifications using pH buffers at 4.0 and 10.0.

The laboratory will follow the calibration procedures found in the methods listed in Table 1 or in the laborato

2.8 Inspection/Acceptance Requirements for Supplies and Consumables

All sample jars used for this project will be new and certified clean provided by the laboratory. Investigators v note of the information on the certificate of analysis that accompanies sample jars to ensure that they meet th specifications and guidance for contaminant free sample containers.

2.9 Data Acquisition Requirements (non-Direct Measurements)

Data previously acquired for the facility shall only be used for historical research of the facility and not as a b compliance or non-compliance determination at the time of the inspection.

2.10 Data Management

A field log notebook, photos, GPS location data and the Field Sample and Chain of Custody Data Sheets will b to document the sampling and inspection activities. For each sample location, the following will be recorded notebook: facility name and address, sample number, date, time of each sample collection, physical descriptio sample collection point, weather conditions, color, sample appearance, sample identifier, and measurements. Sample and Chain of Custody Data Sheets will have the following information: site name, sample number, dat each sample collection, sampler's name or initials and sampling location. If applicable, a suffix l -FD will be a to the sample identified as the field duplicate. For fixed laboratory analyses, field duplicates will be assigned unique sample identifier and will be submitted 'blind' to the analytical laboratory. Analytical duplicate results reported with a trailing -AD (analytical duplicate) or D.

All inspection reports including those for potential enforcement cases will be completed within two months c date. Validated laboratory results and interpretation (if necessary) will be appended. Reports will be maintain enforcement confidential documents until release is approved by the USEPA Office of Regional Counsel (OR Photographs and other supporting data along with the inspection report will be used to determine RCRA comp

All data generated during this project will be processed, stored, and distributed according to laboratory's SOP

3.0 Assessment/Oversight

3.1 Assessments and Response Actions

The RI will be responsible for reviewing field log notebooks for accuracy and completeness within 48 hours c inspection. Sample results provided to the RI by the laboratory will be appended to the inspection reports. Th compare the sample information in the field log notebooks with the analytical results appended to the inspecti to ensure that no transcriptions errors have occurred.

RPDs between field duplicate and analytical duplicate measurements will be calculated. RPD's greater than tl requirements will be noted in the associated inspection reports. The RI will decide if any corrective action wi in the event that the RPD's exceed the project's goals. Validated laboratory data will be provided to the RI wh be responsible for appending the data to the inspection report. If evidence of non-compliance is observed witl data, depending on the requirements of the office conducting the inspection, the RI submits the final inspectic and an RCO may be assigned to further investigate the facility.

MEL routinely performs performance checks using different program specific blind and double blind check st An internal assessment of the data and results are also routinely conducted by the appropriate supervisors and Laboratory QA Coordinator. The laboratory also participates in the EPA's round robin studies. No additional will be performed on the laboratory for this project.

Corrective action procedures that might be implemented from QA results or detection of unacceptable data wi developed if required and documented in Attachment 2.

3.2 Reports to Management

Only the data validation reports with the properly qualified data shall be provided to the RI. If, for any reason, schedules or procedures above cannot be followed, the RI must complete the Attachment 2-Sample Alteratio (SAF). The SAF should be reviewed and approved by the QAO. The laboratory should be given a copy of the C approved SAF for reference and project file.

4.0 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The criteria for the validation will follow those specified in this QA plan and the criteria specified in the meth

4.2 Validation and Verification Methods

All data generated shall be validated in accordance with the QA/QC requirements specified in the methods, the technical specifications outlined in the QAPP and the Functional Guidelines for Inorganic and Organic Data R 2/94. The summary of all analytical results will be reported to the RCO. The raw data for this project shall be maintained by the laboratory. Data validation will be performed by the laboratory for all the analyses prior to t release of data. The laboratory will also archive the analytical data into their laboratory data management syste

All data will be validated according to laboratory SOP's.

4.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in a data report pac

Table 1. Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Trip Blanks / Equipment Rinsate Blank	MS / MSD Samples	Matrix	EPA Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Laboratory Measurements												
TCLP Metals				solid	1311/6000/ 7000	see Target Compound List	75-125	35	100	4C	1 8-oz P, G Jar with Teflon lid	TCLP - 6 months Analysis 6 months
TCLP VOCs				solid	1311/8260	see Target Compound List	50-150	50	100	4C	1 8-oz G Jar with Teflon lid	14 days - TCLP 14 days- analysis
TCLP Pesticides				solid	8081A	see Target Compound List	50-150	50	100	4C	1 8-oz G Jar with Teflon lid	14 days TCLP 40 days analysis
TCLP SVOCS				solid	8270B	see Target Compound List	50-150	50	100	4C	1 8-oz G Jar with Teflon lid	14 days TCLP 40 days analysis
TCLP Mercury				solid	1311/245.1 7470A	0.1 mg/L	75-125	35	100	4C	1-8 oz P,G Jar with Teflon lid	28 days TCLP 28 days analysis
TCLP Mercury-semi-liquid				semi-liquid	1311/245.5/ 7471B	0.02 mg/L	75-125	35	100	4C	1-8 oz P,G Jar with Teflon lid	28 days TCLP 28 days analysis
Flash Point liquid				liquid	ASTM-d-9379/1010	NA	NA	NA	100	4C	1-8oz P,G Jar with teflon lid	none
Flash Point solid				solid	ASTM-d-93-80/1030	NA	NA	NA	100	4C	1 8 oz P,G Jar with Teflon lid	none
PAH				solid	8270B	see Target Compound List	50-150	50	100	4C	1 8-oz G Jar with Teflon lid	14 days extraction 40 days - analysis
TPH				solid	8440 or equivalent	see Target Compound List	50-150	50	100	4C	1-8 oz G Jar with Teflon lid	14 days extraction 40 days analysis
Field Measurements												
pH				solid/ liquid	9045C	NA	± 0.1 pH Unit	± 0.1 pH Unit	100%	None Required	Field Sample Container	Analyze Immediately

1 - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.
NOTE: Include one temperature blank per ice chest shipped.

Attachment 1. Sample Alteration Form

Project Name and Number: ____

Material to be Sampled: ____

Measurement Parameter:____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):
____
____
____
____

Reason for Change in Field Procedure or Analysis Variation:
____
____
____
____

Variation from Field or Analytical Procedure:
____
____
____
____

Special Equipment, Materials or Personnel Required:
____
____
____
____

Initiators Name:_____________________________________ Date: ____________

Project Officer:_____________________________________ Date:____________

QA Officer:____ Date:____________

Attachment 2. Corrective Action Form

Project Name and Number:____
Sample Dates Involved: ____
Measurement Parameter:____

Acceptable Data Range:____
____
Problem Areas Requiring Corrective Action:____
____
____
____

Measures Required to Correct Problem:____
____
____
____
Means of Detecting Problems and Verifying Correction:____________________________________
____
____
____

Initiators Name:___________________________________ Date:____________

Project Officer:___________________________________ Date:____________

QA Officer:______________________________________ Date:____________

Attachment 3: RCRA Site-Specific Inspection Plan (RSSIP)

This RSSIP will be prepared and used in conjunction with the Generic RCRA QAPP, Revision 1.1, Rev. 04/01 for collecting samples of opportunity during an announced and unannounced inspections. Please refer to the Generic QAPP for specific details regarding RSSIP. Note: Page 3, Table -1 DQOs : Do not remove analytes from this generic table. Fill in the number of samples for each applicable analysis/matrix. If the number of samples column is left blank for a particular analysis, the RSCC, QAO and LAB will presume that the analysis is not required for the project. Submit the RSSIP to the RSCC for laboratory coordination/sample numbers/project information and to the QAO for review and concurrence. This form can be E-mailed to castrilli.laura@epa.gov or hall.christopher@epa.gov or faxed - 206-553-8210.

STATUS: (Check)	Enforcement sensitive:		CBI		Open:		Routine:		Others:	

Site Name/Facility Type:	
Address:	
Contact Person:	
E-mail Address /Phone Number:	

COOPERATING AGENCIES/PARTIES INVOLVED:

Contact Person	Agency	Phone Number

AUTHORIZED INSPECTOR/SAMPLE COLLECTOR AND PHONE NUMBER:

SPECIAL CONSIDERATIONS OR "OPEN" REQUIREMENTS:

TENTATIVE PROJECT SCHEDULE

Activity	Estimated Start Date	Estimated Completion Date	Comments
Mobilize to Site			
Sample Collection			
Laboratory Receipt of Samples			

Target Completion Date			

RCRA Site-Specific Inspection Plan (RSSIP)

FOR RSCC USE ONLY

RSCC Receipt of RSSIP and Request to Lab: ________________________ *Date :*__________
(Name)

*Project Code:*__________ *Account Code: 0102B10P90102E - RCRA*

Sample Numbers Assigned: From ___________________ *To* _____________________

RSCC Receipt of Response from the Lab: ________________________ *Date :*__________
Print Name

FOR LAB USE ONLY

Accepted Parameters: ____
____

Rejected Parameters: ____
____

Comments: ____
____

*Transmitted by:*_________________________________ *Date:* ______________________
Print Name

FOR QAO REVIEW ONLY

*QA Reviewer Concurrence with the RSSIP :*________________________ *Date :*__________
Print Name and Signature

If the QA reviewer has concerns and comments, a signed copy of the comments should be sent to the RI, RCO, RSCC and the laboratory. The comments should be attached to the project file.

RCRA Site-specific Inspection Plan Table 1. Data Quality Objectives Summary

Analytical Group	Total Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Trip Blanks / Equipment Rinsate Blank	MS/MSD Samples	Matrix	EPA Method	Method Detection Limits	Preservation	Volume, Container	Holding Time (days)
Laboratory Measurements									
TCLP Metals				solid	1311/6000/ 7000	see Target Compound List	4C	1 8-oz P, G Jar with Teflon lid	TCLP - 6 months Analysis 6 months
TCLP VOCs				solid	1311/8260	see Target Compound List	4C	1 8-oz G Jar with Teflon lid	14 days - TCLP 14 days- analysis
TCLP Pesticides				solid	8081A	see Target Compound List	4C	1 8-oz G Jar with Teflon lid	14 days TCLP 40 days analysis
TCLP SVOC's				solid	8270B	see Target Compound List	4C	1 8-oz G Jar with Teflon lid	14 days TCLP 40 days analysis
TCLP Mercury - solid				solid	1311/245.1 7470A	0.1 mg/L	4C	1-8 oz P,G Jar with Teflon lid	28 days-TCLP 28 days analysis
TCLP Mercury- semi-liquid				semi-liquid	1311/245.5 7471B	0.02 mg/L	4C	1-8 oz P,G Jar with Teflon lid	28 days-TCLP 28 days analysis
Flash Point liquid				liquid	ASTM-d-9379/1010	NA	4C	1-8oz P,G Jar with teflon lid	none
Flash Point solid				solid	ASTM-d-93-80/1030	NA	4C	1 8 oz P,G Jar with Teflon lid	none
PAH				solid	8270B	see Target Compound List	4C	1 8-oz G Jar with Teflon lid	14 days extraction 40 days - analysis
TOX				solid/ liquid	300.0	Per method	4C	1-L or 1-8 oz jar	28days
TPH				solid	8440 or equivalent	see Target Compound List	4C	1-8 oz G Jar with Teflon lid	14 days extraction 40 days analysis
Field Measurements									
pH				solid/ liquid	9045C	NA	None Required	Field Sample Container	Analyze Immediately

1 - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G -Pplastic, Glass
NOTE: Include one temperature blank per ice chest shipped.

GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR

CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO) SAMPLING

Date: February, 2002
Revision: 1.0

APPROVAL OF QAPP:

___________________________________ Date: _____________
Randy Smith, Director
Office of Water

__________________ Date:_______
Barry W. Towns, Manager
QA and Data Unit, OEA

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1.0 Project Management Elements

1.1 Distribution List

Copies of the completed/signed project plan should be distributed to:

EPA Inspector	Name, Mail Stop
RSCC	Laura Castrilli, OEA-095
QA Officer	Barry Towns, OEA-095
Laboratory Supervisory Chemist	Stephanie Harris, LAB

Electronic copies of data are not required unless specifically requested.

1.2 Project/ Task Organization

This section identifies the personnel involved in CAFO inspection sampling and analytical activities and defines their respective responsibilities in the process.

1. Inspector

The inspector conducts the inspection under the authority provided by the Clean Water Ac. The inspectors responsibility is to prepare a final inspection report to be submitted to the immediate program manager based on the results of the inspection conducted and the sample analytical data obtained from the laboratory. In conjunction, the inspector shall also be responsible for:

- Site inspection and recording observations in a note book;
- Documenting the location of site using GPS;
- Conducting dye tracer tests if appropriate;
- Conducting direct readings such as pH, temperature, dissolved oxygen, etc... if appropriate;
- Collecting water or effluent samples if appropriate;
- Coordinating with the Regional Sample Control Center (RSCC) for regional sample numbers;
- Coordinating with the mobile EPA laboratory for sample analysis;
- Maintaining sample documentation, including chain of custody, photographs, and receiving sample analytical results.

All of these tasks shall be performed in accordance with the approved QA Plan for CAFO inspections. Changes in procedure should be documented in an appropriate addendum to the plan or sample alteration form included with the site specific inspection plan.

2. Regional Sample Control Center (RSCC)

The role of RSCC is to coordinate and schedule sample delivery and analysis with the regional laboratory based on the information provided by the inspector in the CAFO Inspection Plan Form (see attachment 1). For sample tracking, the RSCC also provides the inspector with the regional sample numbers and the corresponding project work and account numbers. Region 10 RSCC is located within the Region 10 QA Office.

3. Manchester Environmental Laboratory (MEL)

This is the EPA regional analytical laboratory located at Port Orchard, WA. For CAFO inspections, a mobile on-site laboratory has been established for analyzing samples for E. Coli and fecal coliform. Samples to be analyzed for biochemical oxygen demand (BOD) or nutrients will be done at the MEL. For the CAFO program, MEL is responsible for the following tasks: sample analysis; data generation; reduction and validation; submission of data print-outs for each sample to the inspector and a QC summary for precision and accuracy information for the analysis performed.

1.3 Problem Definition/ Background

1.3.1 Background

The Federal and State National Pollutant Discharge Elimination System (NPDES) program monitor and regulates the discharge of pollutants from point sources to waters of the United States. Concentrated Animal Feeding Operations (CAFOs) are point sources, as defined by the CWA [Section 502(14)]. CAFO means an "animal feeding operation" (AFO) which meets the criteria in 40 CFR part 122, appendix B, or which the EPA designates as a significant contributor of pollution pursuant to 40 CFR 122.23.

The purpose of this Generic Quality Assurance Project Plan (QAPP), therefore, is to provide Inspectors from the Office of Water, Region 10 State Offices and the Office of Environmental Assessment with basic Quality Assurance Project Plan (QAPP) that will address the project required Data Quality Objectives and provide guidelines on sample collection, sample documentation, analytical methods and data validation and interpretation of data deliverables. This document was prepared in compliance with the EPA Order 5360.1A2, the Agency required R5 document format, “EPA Requirements for Quality Assurance Project Plans”, Final Version: March, 2001, and the “USEPA Region 10 Expanded Guidance for Preparing Quality Assurance Project Plans”, Revision 1.0 dated 12/7/98.

1.3.2 Objectives/Scope

- Determine compliance with the Clean Water Act through the collection of samples of opportunity from the facilities inspected.

1.4 Project/ Task Description and Schedule

1.4.1 Project/Task Description

This Generic QA Project Plan is developed for the purpose of supporting announced and unannounced CAFO inspection and sampling activities that may be performed as part of the NPDES program. Samples for coliform determination will be analyzed on-site by MEL microbiology mobile lab. Samples for other parameters (if needed) will be analyzed by MEL.
All of the analyses will be performed in accordance with the analytical methodology specified in Table 1 - Data Quality Objectives Summary of the CSSIP. See the sample collection section and specific analyses that will be performed.

1.4.2 Schedule of Tasks *

Activity	Estimated Start Date	Estimated Completion Date	Comments
Obtain block of numbers from RSCC			
Mobilize to Sites	See CSSIP		
Sample Collection			
On-site Analysis of Samples			
Data Validation			
Target Completion Date			

* Note: Since most of the inspections are unannounced and the facilities nor the parameters of concern are unknown, the inspectors are allowed to submit the Site Specific Inspection QA Plan within 30 days from the last day of sample collection.

1.4.3 CAFO Site-Specific Inspection Plan (CSSIP)

The CAFO Site-Specific Inspection Plan (CSSIP) is a two- page summary of the sampling, analysis and QA requirements that may be performed during facility inspections. The CSSIP is submitted to the QA Office within 30 days from the last day of sample collection. The first page of CSSIP contains the project, the account code, EPA sample numbers assigned for inspection, list of facilities inspected, address, contact person and phone number, the names of inspectors conducting the inspection , their respective environmental organization affiliations, the total number of samples collected per facility, the parameters that were determined. The second page of CSSIP consists of a Table summarizing the analytical requirements of the inspection, the number of samples collected, the parameters for analysis, the analytical procedure and methodologies that will be used and the Data Quality Objectives (DQOs) requirements of the inspection which are filled in by the EPA Inspector. If applicable, Attachment 1 - Sample Alteration Form and Attachment 2 - Corrective Action Form, may also be included with the CSSIP. The CSSIP is submitted to the QA Office for review and approval before a scheduled sampling event or immediately after collecting samples of opportunity. A blank 3-page CSSIP is attached at the end of this Generic QAPP.

1.5 Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms inspectors and project managers use to describe how good the data needs to be in order to meet the project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, comparability, and measurement range. The overall QA objective for analytical data is to ensure that data of known and acceptable quality are provided. To achieve this goal, data must be reviewed for 1) representativeness, 2) comparability, 3) precision, 4) accuracy (or bias), and 5) completeness. Precision, accuracy, completeness, sample representativeness and data comparability are necessary attributes to ensure that analytical data are reliable, scientifically sound, and defensible. Each analytical result or set of results generated should be fully defensible in any legal action, whether administrative, civil or criminal.

Precision: The precision of each test depends on the number of tubes used for the analysis. The method that is used for the CAFO analysis (SM 9221) utilizes a confidence limit of 95 %. Samples in duplicate will be analyzed on 10 % of samples collected. The precision can be evaluated by the Relative Percent Difference??? (RPD) between the duplicate samples.

Accuracy: This is not true relative to microbiology. The method has a detection limit of 1 MPN/100 ml. For other parameters analyzed in the fixed laboratory, accuracy will be evaluated by the use percent recovery (%R) of the target analyte in spiked samples and also the recoveries of the surrogates in all samples and QC samples

$$\% \text{ Recovery} = \frac{SQ - NQ}{S} \times 100$$

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

Representativeness is the degree to which data from the project accurately represent a particular characteristic of the environmental matrix which is being tested. Representativeness of samples is ensured by adherence to standard field sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of samples should provide a representativeness of each matrix or product of the chemical processes being

Comparability is the measurement of the confidence in comparing the results of one experiment with the results of different experiments using the same matrix, sample location, sampling techniques and analytical metho

Completeness: Completeness is the percentage of valid results obtained compared to the total number of samples taken for a parameter. Since sampling from inspections are usually grab and limited in number of samples, the number of valid results obtained from the analyses are expected to be equal or better than 85%. %Completeness may be calculated using the following formula:

$$\% \text{ Completeness} = \frac{\# \text{ of valid results}}{\# \text{ of samples taken}} \times 100$$

The QA objectives outlined, above, will be evaluated in conjunction with the data validation process.

1.6 Special Training Requirements/ Certification

Inspectors are required to complete the 24-hour Basic Health and Safety training. The inspectors will obtain a basic health and safety training certification from the 24-hour training which should be maintained current by attending an 8-hour safety training refresher course every year. The inspectors must also have a signed and current "credential" certifying the bearer as "Authorized to Conduct Investigations and Inspections Pursuant to All Federal Laws Administered by the United States Environmental Protection Agency". All of the training courses listed above are provided by EPA Region X. Furthermore, sampling and sample documentation skills are also assured by the "mentoring" provided by the senior inspectors in the field.

Scientists (Microbiologists/Chemists) performing the analytical work for this project have extensive knowledge, skill and demonstrated experience in the execution of the analytical methods being requested.

1.7 Documentation and Records

Complete documentation for inspections may include but not limited to the following forms which has to be completed and collated by the EPA Inspector:

Investigation Report
Records Inspection Checklist
Chain of Custody Logs
Record of Sampling
Laboratory Analysis Reports
Photographs, Sketches, Paper Copies, Chemical Labels, MSDS, Application Records or other documentation.

Investigators will maintain field notes in a bound notebook and all documents, records, and data collected will be kept in a case file and submitted to the program office with the final inspection report.

The following documents will be archived at the Manchester Environmental Laboratory or the designated laboratory performing the analysis: (1) signed hard copies of sampling and chain-of-custody records (2) electronic and hard copy of analytical data including extraction and sample preparation bench sheets, raw data and reduced analytical data.

The laboratory will store all sample receipt, sample login, extraction documentation, and laboratory instrument documentation per SOP.

2.0 Measurement/ Data Acquisition

2.1 Sampling Process Design (Experimental Design)

Prior to compliance inspections, the EPA Inspector will review and evaluate facility files, if available, which may include facility background information, historical ownership, facility maps depicting general geographic location, property lines, surrounding land uses, a summary of all possible source areas of contamination, a summary of past permits requested and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the facility, records and inspection reports from previous compliance site visits

Based on the data and visual inspection of the facility, samples of opportunity on an "as needed" basis will be collected for analysis to characterize the pollutants and determine if they are in compliance with the Clean Water Act.

2.2 Inspection and Sample Collection Procedures

2.2.1 Health and Safety

Inspectors visiting animal feeding operation facilities, need to be aware of and sensitive to bio-security issuesand/or procedures related to the potential disease transmission from one facility to another. Facility owners/operators may deny access to a facility because of the existence of a disease or illness at the facility. In addition, there is a real potential that the CAFO inspector may be the vector that transmits a disease from one facility to another if proper precautions are not taken. Minimal recommendations are that visitors to facilities wear freshly laundered clothing and clean footwear, or disposable and easy to clean rubberized rain gear, booties and gloves. Options for decontamination of shoes, clothing, and sampling equipment (e.g., wearing rubber boots and cleaning them with disinfectant before and after an inspector visits a facility or adjacent property) should be used by inspec

2.2.2 Location

CAFO inspectors should use the Global Positioning System (GPS) for documenting locations of facilities inspected. A calibrated GPS instrument can be checked out through the Quality Assurance and Data Unit.

2.2.3 Dye Tracer Tests

Inspector should follow the manufactures directions when using dye tracers. Examples of directions for some dye products currently in EPA field supply storage are included in (attachment ~~3~~???).

Contacts for dye tracer test notification: Inspector should consider notifying local authorities (eg. State Department of Ecology or Environmental Quality, Department of Agriculture, or law enforcement).

2.2.4 Sample Collection

Sample collection methods can vary between standard operating procedures used by samplers and different conditions encountered in the field. The following is as general guidance for samplers. Whatever the case, samplers should document in their notes or field checklist the actual method used to obtain samples.

If samples are collected manually, rubber gloves should be worn to protect the sampler. Also, the use of safety glasses should be considered. Additional safety information should be covered in a site safety plan or pre-inspection safety briefing.

When a discharge point is identified, the sampler should consider collecting, when possible, samples at a minimum of one collection point. This collection point should be obtained at the discharge point. More sample collection points may be collected by the inspectors if necessary.

When dip samples are taken for coliform analysis, the sampler should carefully remove the foil cap, ensuring that the neither the inside of sample bottle or cap are touched. If possible, hold the foil-covered cap, do not set

To the extent possible, take the sample by holding the bottle near its base in the hand and plunging it, neck downward, below the surface. Use an extension pole if needed to keep from walking into the effluent stream and stirring up the sampling area. Turn bottle until neck points slightly upward and mouth is directed towards the current. If there is no current, create a current by pushing bottle forward horizontally in a direction away from the hand. If available, there are special apparatuses that will permit mechanical removal of the cap below the water surface. This can be used to avoid potential contamination of the sample by the sampler.

After collection, carefully recap the sample bottle securely leaving the foil cap in place. There should be a 1 inch head space in the neck of the bottle, to allow adequate mixing by the analyst. If, however, the sample container is overfilled, DO NOT pour out any excess sample. Place the cap back securely on the sample bottle and return to analyst overfilled and a notation will be made in the analyst's report. The sample bottle should be labeled with the date and time of collection, collector's name and sample number, and type of analysis requested. This information should be written on the label using an indelible, waterproof ink. Sample bottle should be placed in plastic bags and stored on ice immediately following collection until they are accepted by the analyst. Proper chain of custody procedures should be followed at all times.

Transfer blank: Each inspector will be provided a single transfer blank for each facility to be inspected and an extra sterile bottle. Half way through the sample collection for each facility, transfer the contents of the full bottle into a sterile bottle. Be careful not to contaminate the inside of the bottle or cap during transfer. Label this bottle with date and time of transfer, name of collector, sample number and label the bottle as a TRANSFER BLANK.

If analysis of additional parameters is needed in a specific case, additional sample containers may be needed. Required sample volume, container type, preservation techniques, and holding times for parameters likely to be sampled are included in (table 1). Inspectors should use their discretion on which parameters should be used to document violations at a particular facility and are encouraged to discuss this with representatives of the CAFO program.

2.2.5 Sample Equipment

Equipment needs will vary from inspection to inspection. The list in Table 2 provides suggestions to be considered prior to leaving for the field.

Table 1 -Suggested Sample Equipment for CAFO Field Inspections

General	Safety	Emergency
Inspector Credentials Field Notebook Camera Waterproof Pens & Markers Clipboard flashlight Extension Sampling Pole Sample containers Ice Chest Disinfectant Solution (bleach) and Water for boots[1] Extra Set of Coveralls	Water Proof (Rubber) Boots Rain gear Rubber gloves Soap, towels, and water for washing hands Eye protection Hard hat	First Aid Kit Phone numbers Cell Phone

[1] Samplers should disinfect rubber boots before exiting CAFO facilities to help avoid transmitting animal pathogens from one facility to another. See Section 2.2.1 Health and Safety.

2.3.3 Shipping Requirements

All of the samples are hand-delivered to the laboratory analyzing the samples. Samples for coliform analysis will be hand-delivered to the mobile microbiology laboratory within 6 hours of sample collection. Sufficient ice must be provided to assure that samples remain cold until received and processed by the laboratory.

2.3.4 Decontamination Procedures

Samples will be collected using clean sampling devices and sample collection gears. Sampling devices and sample collection gears like rain gear, rubber boots and gloves will be cleaned and decontaminated using an approved disinfectant~~s~~. Inspectors will follow the proper health and safety procedures when collecting and handling samples to minimize or not to incur contamination.

2.4 Analytical Methods Requirements

Not all parameters will be measured for each CAFO facility inspected. In some cases no samples will be taken at all, and in others samples may be analyzed for coliform only. In other situations, samplers may be requested to collect additional data such as temperature, pH, turbidity, conductivity, etc.... Table 2 - Data Quality Objective Summary lists the parameters that can be measured under this plan, the accuracy, precision, preservative and holding times requirements.

2.5 Quality Control Requirements

Quality Control procedures for analyte measurements will be according to the requirements specified in the method that will be used in the analysis.

Laboratory instrumentation will be calibrated in accordance with the analytical procedure. Laboratory instrumentation will be maintained in accordance with the instrument manufacturer's specifications and the laboratory Standard Operating procedures (SOPs).

<u>Other Quality Control Measures</u>

- Media, reagents and water - Media and reagent water required for field analysis will be prepared at the MEL and transported to the field site. QC tests specified for drinking water analysis will be conducted on these supplies prior to being transported. Media will be stored in tightly capped tubes in such a way to prevent formation of air bubbles and adverse environmental effects.

- Incubator and waterbath - temperature will be maintained within specified temperature ranges. Thermometers used for recording temperatures will be calibrated against NIST certified thermometer on a yearly basis. Temperatures will be read and recorded twice daily. Waterbath will be transported without water. Water will be added when laboratory is delivered.

- Refrigerator (if present) - temperature will be maintained within specified temperature ranges. Thermometers used for recording temperatures will be calibrated against NIST certified thermometer on a yearly basis. Temperatures will be read and recorded twice daily.

- Positive and negative controls:

  Positive and negative culture controls: organisms as specified in SM 9020B (Intra-laboratory QC guidelines) will be used on a daily basis to ensure the quality of the media and laboratory equipment has not char

- Negative laboratory control:

  A media sterile check will be done on a daily basis to ensure that no changes in media sterility have occurred.

- Duplicates:

  Ten percent of routine samples will be processed in duplicate, or a minimum of one per day that samples are received, whichever is greater. A duplicate sample is performed from the same sample bottle. Samples for microbiological analyses on-site are not required to be preserved.

- Laboratory Temperature:

  Must be maintained within a few degrees of 35 °C to ensure incubator temperature consistency. This will be accomplished with the use of thermostatically controlled electric heaters or thermostatically controlled propane forced air heater.

- Sample Disposal:

  All “spent” growth media will be autoclaved prior to disposal. All unused water samples will be disposed of in a manner that will not result in contamination of the surrounding environment.

2.6 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The laboratory will follow their standard operating procedures for any preventative maintenance required on laboratory instruments or systems used for this project.

2.7 Instrument Calibration and Frequency

Field maintenance and calibration will be performed where appropriate prior to use of the instruments. Calibration of samplers will be performed in accordance with the methodologies used in sample collection and the Instruments Operational Instructions.

The laboratory will follow the calibration procedures found in the methods listed in Table 1 or in the laboratory’s SOPs.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables

Sample bottles used for microbial testing will be appropriately cleaned and sterilized as per MEL SOP MiG001A. They will be polypropylene bottles (250 or 500 ml), sterilized with foil tent on the cap. All sample jars used for chemical analysis in this project will be new and certified clean provided by the laboratory. Investigators will make note of the information on the certificate of analysis that accompanies sample jars to ensure that they meet the specifications and guidance for contaminant free sample containers.

2.9 Data Acquisition Requirements (non-Direct Measurements)

Not Applicable.

2.10 Data Management

A field log notebook, photos, GPS location data and the Field Sample and Chain of Custody Data Sheets will be used to document the sampling and inspection activities. For each sample location, the following will be recorded in the notebook: facility name and address, sample number, date, time of each sample collection, physical description of each sample collection point, weather conditions, color, sample appearance, sample identifier, and measurements. The Field Sample and Chain of Custody Data Sheets will have the following information: site name, sample number, date, time of each sample collection, sampler's name or initials and sampling location. If applicable, a suffix l -FD will be appended to the sample identified as the field duplicate. For fixed laboratory analyses, field duplicates will be assigned a separate unique sample identifier and will be submitted 'blind' to the analytical laboratory. Analytical duplicate results will be reported with a trailing -AD (analytical duplicate) or D.

All inspection reports including those for potential enforcement cases will be completed within 30 days of inspection date. Validated laboratory results and interpretation (if necessary) will be appended. Reports will be maintained as enforcement confidential documents until release is approved by the USEPA Office of Regional Counsel (ORC). Photographs and other supporting data along with the inspection report will be used to determine NPDES compliance.

All data generated during this project will be processed, stored, and distributed according to laboratory'

3.0 Assessment/Oversight

3.1 Assessments and Response Actions

The EPA Inspector will be responsible for reviewing field log notebooks for accuracy and completeness within 48 hours of each inspection. Sample results provided to the EPA Inspector by the laboratory will be appended to the inspection reports. The EPA Inspector will compare the sample information in the field log notebooks with the analytical results appended to the inspection report to ensure that no transcriptions errors have occurred

With the exception of the microbiological analyses, RPDs between field duplicate and analytical duplicate measurements will be calculated by the laboratory. RPD's greater than the project requirements will be noted in the associated inspection reports.

Laboratories routinely perform performance checks using different program specific quarterly blind and double blind check standards. Each method of analysis requires specific QA/QC runs that must be complied with by the laboratory performing the analysis. An internal assessment of the data and results are also routinely conducted by the appropriate supervisors and the Laboratory QA Coordinator. No additional audits will be performed on the laboratory for this project.

Corrective action procedures that might be implemented from QA results or detection of unacceptable data will be developed if required and documented in Attachment 2.

3.2 Reports to Management

Only the data validation reports with the properly qualified data shall be provided to Mr. Joe Roberto (CO) of the Office of Water. If, for any reason, the schedules or procedures above cannot be followed, the EPA Inspector must complete the Attachment 1-Sample Alteration Form (SAF). The SAF should be reviewed and approved by the QAO. The laboratory should be given a copy of the QAO approved SAF for reference and project fil

4.0 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The criteria for the validation will follow those specified in this QA plan and the criteria specified in the

4.2 Validation and Verification Methods

All data generated shall be validated in accordance with the QA/QC requirements specified in the methods, and the technical specifications outlined in the QAPP. The summary of all analytical results will be reported to the EPA Inspector and Mr. Joe Roberto. The raw data for this project shall be maintained by the laboratory. Data validation will be performed by the laboratory for all the analyses prior to the release of data. The laboratory will also archive the analytical data into their laboratory data management system.

4.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in a data report package

Table 2. Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Lot Blanks/	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Mobile Laboratory Measurements												
Fecal Coliform Mobile Lab		10% dup or 1 per day	NA	water	9221E		1 MPN/ 100 ml	varies	95	Cool on ice	Use sample from Fecal Coliform	6 hours[3]
E. Coli Mobile Lab		10% dup or 1 per day	NA	water	9221F		1 MPN / 100 ml	varies	95	Cool on ice	Use sample from Fecal Coliform	6 hours[3]
Fixed Laboratory Measurements												
TKN[4]		10% dup or 1 per day		water	351.2	0.2 mg/ L	75-125%	$\pm$ 20RPD	95	Cool on Ice H_2SO_4 <2	250 mL P, G	28 days
Total Phosphororus		10% dup or 1 per day		water	365.1	0.01 mg/L	75-125%	$\pm$ 20RPD	95	Cool on Ice H_2SO_4 <2	Can Use Sample for TKN	28 days
BOD		10% dup or 1 per day		water	5210B	4 mg/L	NA	$\pm$ 20RPD	95	Cool on Ice	2,500 mL P. G (may use 1 gal cubitainer)	48 hours (receipt at lab by noon on last day of collection)
Field Measurements												
Dissolved Oxygen		10% dup or 1 per day		water	360.1		0.1 mg/L	$\pm$ 20RPD	100	Not Required	500 ml G	Analyze Immediately
Turbidity Mobile Lab		10% dup or 1 per day		water	180.1	0.1 NTU	NA	$\pm$ 20RPD	100	Cool on Ice	100 mL	48 hours
pH		10% dup or 1 per day		water	150.1		NA	$\pm$ 20RPD	100	Not Required	100 ml P, G	Analyze Immediately
Temperature		10% dup or 1 per day		water	2250B		NA	NA	100	Not Required	Not Required	Analyze Immediately

[1] - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.
[2] - Sodium thiosulfate
[3] - Non-potable water samples have a 6 hour holding time from the time of sample collection until receipt at the laboratory. Additional 2 hours holding time are allowed from the verified time of sample receipt in the lab until the samples are seeded nto an inoculation broth.
[4] - Total Kjeldahl Nitrogen

Attachment 1. Sample Alteration Form

Project Name and Number: ____

Material to be Sampled: ____

Measurement Parameter:____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):

____

____

____

____

Reason for Change in Field Procedure or Analysis Variation:

____

____

____

____

Variation from Field or Analytical Procedure:

____

____

____

____

Special Equipment, Materials or Personnel Required:

____

____

____

____

Initiators Name:______________________________________ Date: ____________

Project Officer:______________________________________ Date:____________

QA Officer:____ Date:____________

Attachment 2. Corrective Action Form

Project Name and Number:____
Sample Dates Involved: ____
Measurement Parameter:____

Acceptable Data Range:____
____

Problem Areas Requiring Corrective Action:_____________________________________
____
____
____

Measures Required to Correct Problem:____
____
____
____

Means of Detecting Problems and Verifying Correction:_________________________
____
____
____

Initiators Name:______________________________________ Date:_____________

Project Officer:______________________________________ Date:_____________

QA Officer:____ Date:_____________

Attachment 3: CAFO Site-Specific Inspection Plan (CSSIP)

This CSSIP will be prepared and used in conjunction with the Generic CAFO QAPP, Revision 1.0, Rev. 02/02 for collecting samples of opportunity during an announced and unannounced inspections. Please refer to the Generic QAPP for specific details regarding CSSIP. Note: Page 3, Table -1 DQOs : Do not remove analyte from this generic table. Fill in the number of samples for each applicable analysis/matrix. If the number of samples column is left blank for a particular analysis, the RSCC, QAO and LAB will presume that the analysis is not required for the project. Submit the CSSIP to the RSCC for laboratory coordination/sample numbers/project information and to the QAO for review and concurrence. This form can be E-mailed to castrilli.laura@epa.gov or hall.christopher@epa.gov or faxed - 206-553-8210.

Project Account Code	Sample Numbers	EPA Inspectors/Phone Numbers/Mail Stop

COOPERATING AGENCIES/PARTIES INVOLVED:

Contact Person	Agency	Phone Number

LIST OF FACILITIES INSPECTED

Facility Name(s)	Address	Contact person	E-mail/phone Number	# Samples collected

FOR QAO ONLY

QA Reviewer Concurrence with the CSSIP :________________________ Date :__________

Print Name and Signature

Table 2. Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Lot Blanks/	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Mobile Laboratory Measurements												
Fecal Coliform Mobile Lab		10% dup or 1 per day	NA	water	9221E		1 MPN / 100 ml	varies	95%	Cool on ice	Use sample from Fecal Coliform	6 hours[3]
E. Coli Mobile Lab		10% dup or 1 per day	NA	water	9221F		1 MPN / 100 ml	varies	95%	Cool on ice	Use sample from Fecal Coliform	6 hours[3]
Fixed Laboratory Measurements												
TKN[4]		10% dup or 1 per day		water	351.2	0.2 mg/ L	75-125%	± 20RPD	95%	Cool on Ice H2SO4 <2	250 mL P, G	28 days
Total Phosphororus		10% dup or 1 per day		water	365.1	0.01 mg/L	75-125%	± 20RPD	95%	Cool on Ice H2SO4 <2	Can Use Sample for TKN	28 days
BOD		10% dup or 1 per day		water	5210B	4 mg/L	NA	± 20RPD	95%	Cool on Ice	2,500 mL P. G (may use 1 gal cubitainer)	48 hours (receipt at lab by noon on last day of collection)
Field Measurements												
Dissolved Oxygen		10% dup or 1 per day		water	360.1		0.1 mg/L	± 20RPD	100	Not Required	500 ml G	Analyze Immediately
Turbidity		10% dup or 1 per day		water	180.1	0.1 NTU	NA	± 20RPD	100	Cool on Ice	100 mL	48 hours
pH		10% dup or 1 per day		water	150.1		NA	± 20RPD	100	Not Required	100 ml P, G	Analyze Immediately
Temperature		10% dup or 1 per day		water	2250B		NA	NA	100	Not Required	Not Required	Analyze Immediately

[1] - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.

[3] - Non-potable water samples have a 6 hour holding time from the time of sample collection until receipt at the laboratory. Additional 2 hours holding time are allowed from the verified time of sample receipt in the lab until the samples are seeded nto an inoculation broth.

[4] - Total Kjeldahl Nitrogen

This form must be sent to Melody Walker, RSCC before sampling can occur. RSCC will alert the Manchester Lab and issue sample numbers, all sampling paper work can be ordered from the RSCC.

(206) 553-1106
(206) 553-8210 FAX
Walker.Melody@EPA.GOV

MULTIPLE SITE SPECIFIC CAFO INSPECTION PLAN

Status: **Enforcement Sensitive ____ Non Enforcement ___ Others ___**

MULTIPLE FACILITIES INFORMATION :

Site Names: ____
____

STATE(S):__________________________

IMPORTANT SAMPLING DATE INFORMATION

Sampling date(s)___________ _
Total number of sample numbers requested per week:__________
If shipping samples to Manchester please list estimated date(s) of arrival: ______________

MANCHESTER IS CLOSED AT 4:00PM AND IS NOT OPEN ON SATURDAYS OR HOLIDAYS.

AUTHORIZED INSPECTOR and/or SAMPLE COLLECTOR

Name: ______________________________________ **Phone:** ________________________
Name: ______________________________________ **Phone:** ________________________

COOPERATING AGENCIES INVOLVED

Agency Name: ____
Contact person: ____________________________ **Phone:** ________________________

PROJECT DESCRIPTION - Please explain specific requirements for this project.

Sampling and Analysis specifications are stated in the Generic CAFO QAPP of 11/16/99, Rev. 1

____

PROJECT OFFICER NAMES	PHONE NUMBER
Joe Roberto (Lead), EPA	(206) 553-1669
Dave Domingo, EPA	(206) 553-0530
David Lazzar, EPA, WOO	(360) 753-9469
Jed Januch, EPA	(206) 553-4972
David Terpening, EPA	(206) 553-6905

ESTIMATED REQUESTED ANALYSES

Parameter	Method	Matrix Water, Soil or Other	Estimated Number Of Samples
Coliform Total Coliform Fecal Coliform E-Coli	9221B 9221E 9221F		
Dissolved Oxygen	360.1		
pH	150.1		
Temperature	2250B		
Turbidity	180.1		
Conductivity	2510B		
Nutrients	TKN= 351.2 Total P = 365.1		
BOD	5210B		

SPECIAL COMMENTS AND SAMPLE ALTERATION REQUESTED

____

____

____

____

FOR QAO/RSCC USE ONLY

RSCC RECEIPT AND LAB REQUEST: ___________________ DATE :__________________

QAO CONCURRENCE: __________________________________ DATE :_________________

Project Code: WTR-______ Account Code: 0001B10P90102E - Waste Water

Sample Numbers Assigned: From ______________________ To ____________________

*******NOTE******

This request is being generated by following the Generic Quality Assurance Project Plan (QAPP) For Concentrated Animal Feeding Operations (CAFO) Authorized Inspectors dated 1/16/2000 & 1/27/2000.

(Use other side of form if additional space is needed)

GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR

UNDERGROUND INJECTION CONTROL (UIC) MONITORING AND SAMPLING

Date: March, 2002
Revision: 2.0

APPROVAL OF QAPP:

__________________________________ Date: _____________
Thor Cutler, Project Officer

__________________________________ Date: _____________
Tim Hamlin, Manager
Groundwater Protection Unit, OW

__________________________________ Date: ______________
Randy Smith, Director
Office of Water

__________________ Date:_______
Barry W. Towns, Manager
QA and Data Unit, OEA

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1.0 Project Management Elements

1.1 Distribution List

Copies of the completed/signed project plan should be distributed to:

UIC Compliance Officer (CO)	Tim Hamlin, OW
EPA Inspector/ Project Officer	Thor Cutler, OW
RSCC	Laura Castrilli, OEA-095
QA Officer	Barry Towns, OEA-095
Lab Supervisory Chemist	Joe Blazevich, LAB

Electronic copies of data are not required unless specifically requested.

1.2 Project/ Task Organization

The following is a list of key project personnel and their responsibilities:

Inspector/Project Officer (PO)	______________________	
UIC Compliance Officer (CO):	Tim Hamlin	(206) 553-1563
QA Officer (QAO):	Barry Towns	(206) 553-1675
RSCC:	Laura Castrilli	(206) 553-4323
Laboratory (MEL):	Joe Blazevich	(360) 871-8705

The PO is responsible for planning, sampling design, conducting the inspection, collecting physical and documentary samples, analysis coordination, and preparing the inspection report. In the event of non-compliant results, a UIC CO may be assigned to the case. The PO works with the CO and members of the Region 10 Office of Regional Counsel to resolve non-compliant conditions at a Facility.

The QA Office assists the PO and CO in the development of the Site Specific QA Project Plans (QAPPs). The QA Office also reviews and approves site specific sampling plans, its subsequent revisions and amendments.

The Regional Sample Control Coordinator (RSCC) resides in the QA Office and coordinates sample analyses performed by Manchester Environmental Laboratory (MEL). The PO submits the injection Well Class V Site Specific Inspection Plan (IWVSSIP) to the RSCC and the QAO. The QAO reviews the IWVSSIP. The RSCC informs the laboratory of the upcoming samples from the inspection and reserves laboratory space for the IWVSSIP submitted. The RSCC also provides samplers/inspectors with regional sample tracking numbers, custody seals and chain of custody form

The Laboratory (MEL) is responsible for conducting fixed and on-site laboratory analyses identified in Table 1 of the IWVSSIP and in accordance with the requirements specified in the QAPP and the analytical methods. The supervisory chemist is the technical lead at the laboratory responsible for assigning the appropriate personnel to the project. The laboratory is also responsible for validating laboratory generated data prior to submission to PO.

1.3 Problem Definition/ Background

1.3.1 Background

Underground injection is the technology of placing fluids underground, in porous formations of rocks, through wells or other similar conveyance systems. While rocks such as sandstone, shale, and limestone appear to be solid, they can contain significant voids or pores that allow water and other fluids to fill and move through them. Man-made or produced fluids (liquids, gases or slurries) can move into the pores of rocks by the use of pumps or by gravity. The fluids may be water, wastewater or water mixed with chemicals.

Facilities across the United States and in Indian Country discharge a variety of hazardous and nonhazardous fluids into more than 400,000 injection wells. While treatment technologies exist, it would be very costly to treat and release to surface waters the billions and trillions of gallons of wastes that industries produce each year. Agribusiness and the chemical and petroleum industries all make use of underground injection for waste disposal. When wells are properly sited, constructed, and operated, underground injection is an effective and environmentally safe method to dispose of wastes.

Injection wells, however, have the potential to inject contaminants that may cause our underground sources of drinking water to become contaminated. The most accessible fresh water is stored in shallow geological formations called aquifers and is the most vulnerable to contamination. These aquifers feed our lakes; provide recharge to our streams and rivers, particularly during dry periods; and serve as resources for 92 percent of public water systems in the United States. To monitor compliance of injection wells with the Safe Drinking Water Act (SDWA), EPA established the Underground Injection Control (UIC) Program. The goal of the UIC Program is to protect public health by preventing injection wells from contaminating Underground Sources of Drinking Water (USDW). Fluids cannot be injected if they may cause a public water system to violate drinking water standards or otherwise adversely affect public health.

The UIC Program provides standards, technical assistance and grants to State governments to regulate injection wells in order to prevent them from contaminating drinking water resources. EPA defines the five classes of wells according to the type of fluid they inject and where the fluid is injected as follows:

- Class I wells are technologically sophisticated and inject hazardous and non-hazardous wastes below the lowermost USDW. Injection occurs into deep, isolated rock formations that are separated from the lowermost USDW by layers of impermeable clay and rock.

- Class II wells are oil and gas production, brine disposal and other related wells. Operators of these wells inject fluids associated with oil and natural gas production. Most of the injected fluid is brine that is produced when oil and gas are extracted from the earth (about 10 barrels of brine for every barrel of oil).

- Class III wells are wells that inject super-heated steam, water, or other fluids into formations in order to extract minerals. The injected fluids are then pumped to the surface and the minerals in solution are extracted. Generally, the fluid is treated and re-injected into the same formation. More than 50 percent of the salt and 80 percent of the uranium extraction in the U.S. is produced this way.

- Class IV wells inject hazardous or radioactive wastes into or above underground sources of drinking water. These wells are banned under the UIC program because they directly threaten public health.

- Class V wells are injection wells that are not included in the other classes. Some Class V wells are technologically advanced wastewater disposal systems used by industry, but most are "low-tech" wells, such as septic systems and cesspools. Generally, they are shallow and depend upon gravity to drain or "inject" liquid waste into the ground above or into underground sources of drinking water. Their simple construction provides little or no protection against possible ground water contamination, so it is important to control what goes into them. Class V injection wells are currently regulated by the UIC program, under the authority of the Safe Drinking Water Act. Under the existing federal regulations, Class V injection wells are “authorized by rule” (40 CFR 144). This means that Class V injection wells do not require a permit if they do not endanger underground sources of drinking water and they comply with other UIC program requirements.

More than 600,000 facilities across the United States use shallow Class V on-site disposal systems. On-site disposal systems can provide a cost-effective means for industries, municipalities, and small businesses to dispose of their wastewater, if these systems are properly sited, constructed, and operated to protect our environment and prevent contamination of our underground drinking water resources.

The uses for Class V wells (shallow disposal systems) vary widely. Some examples of Class V wells include:

- A gas station with a service floor drain that leads to a septic system.
- An apartment building with a septic system for sanitary waste disposal.
- A rest stop that uses a cesspool.
- A municipality where storm water flows into drywells.
- A strip mall, with small businesses such as a photo processor and a dry cleaner, that discharge sanitary wastes mixed with process chemicals into a septic system
- An office building that injects water passed through a heat exchanger to cool the building
- A carwash where the waste water enters a floor drain that leads to a drywell or septic system.

The purpose of this Generic Quality Assurance Project Plan (QAPP), therefore, is to provide Inspectors and Compliance Officers from the Office of Water, Office of Waste and Chemical Management (RCRA), Region 10 State Offices and the Office of Environmental Assessment with basic Quality Assurance Project Plan (QAPP) that will address the required Data Quality Objectives for sampling underground injection wells. This QAPP also provides guidelines on sample collection, analysis and data validation and interpretation. This document was prepared in compliance with the EPA Order 5360.1A2, the Agency required R5 document format, “EPA Requirements for Quality Assurance Project Plans”, Final Version: March, 2001, and the “USEPA Region 10 Expanded Guidance for Preparing Quality Assurance Project Plans”, Revision 1.0 dated 12/7/98.

1.3.2 Objectives/Scope

- Conduct sampling for specified parameters at injection, potable, and ground water monitoring wells located in the vicinity of the investigation area.

- Determine whether the potable water wells in the vicinity are being contaminated with waste products from the injection wells.

- If requested, determine the direction of the contamination plume and the source of the contamination.

1.4 Project/ Task Description and Schedule

1.4.1 Project/Task Description

This Generic QA Project Plan is developed for the purpose of supporting announced and unannounced Class V injection well inspection and sampling activities that may be performed in conjunction with the SWDA program. The samples will be analyzed by MEL in accordance with the analytical methodologies specified in Table 1 - Data Quality Objectives Summary of the IWVSSIP. See the sample collection section and specific analyses that will be performed.

1.4.2 Schedule of Tasks

Activity	Est. Start Date	Estimated Completion Date	Comments
Injection Well Class V Site-Specific QAPP Review/Approval		1-2 working days from receipt of 2-page Site-Specific Inspection Plan*	
Mobilize to Site	See IWVSSIP		
Sample Collection			
Laboratory Receipt of Samples			
Laboratory Analysis		5 weeks from sample receipt	
Data Validation		2 weeks from data receipt	

1.4.3 Injection Well Class V Site-Specific Inspection Plan (IWVSSIP)

The Injection Well Class V Site-Specific Inspection Plan (IWVSSIP) is a two- page summary of the sampling activity requirements that may be conducted during facility inspection. The IWVSSIP is submitted to the QA Office for (1) review and approval and (2) for laboratory coordination and scheduling. The first page of IWVSSIP specifies the facility's name, address, contact person and phone number, the names of inspectors conducting the inspection and their respective environmental organization affiliations, QA reviewer's concurrence with the submitted IWVSSIP and the tentative activity schedule of the inspection. Page 1 of IWVSSIP also contains the project code, regional sample tracking numbers and other important information concerning the facility which may be helpful in making decisions about the parameters needed for analysis and the analytical data report distribution list. The second page of IWVSSIP consists of a Table summarizing the analytical requirements of the inspection, the estimated number of samples that will be collected, the parameters required for analysis, the analytical procedure and methodologies that will be used and the Data Quality Objectives (DQOs) requirements of the inspection which are filled in by the PO or the CO. If applicable, Attachment I- Sample Alteration Form and Attachment II- Corrective Action Form, may also be included with the IWVSSIP. The IWVSSIP is submitted to the QA Office for review and approval before a scheduled sampling event or immediately after collecting samples of opportunity. A blank 2-page IWVSSIP is attached at the end of this Generic QAPP.

1.5 Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms inspectors and project managers use to describe how good the data needs to be in order to meet the project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, comparability, and measurement range. The overall QA objective for analytical data is to ensure that data of known and acceptable quality are provided. To achieve this goal, data must be reviewed for 1) representativeness, 2) comparability, 3) precision, 4) accuracy (or bias), and 5) completeness. Precision, accuracy, completeness, sample representativeness and data comparability are necessary attributes to ensure that analytical data are reliable, scientifically sound, and defensible. Each analytical result or set of results generated should be fully defensible in any legal action, whether administrative, civil or criminal.

<u>Precision:</u> Field precision is measured by collecting field duplicate samples at a frequency of specified in IWVSSIP for each matrix collected and measured, and for each inspection event. Laboratory precision and accuracy can be measured by the laboratory measuring Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples and the analysis of laboratory duplicate samples. The laboratory usually performs the analysis of one set of MS/MSD and duplicate field samples per matrix measured or at a frequency specified in the IWVSSIP.

$$RPD = \frac{ABS(R1 - R2)}{((R1 + R2)/2)} \times 100$$

R1 = Recovery for MS or duplicate 1
R2 = Recovery for MSD or duplicate 2

<u>Accuracy:</u> Accuracy will be evaluated by the use percent recovery (%R) of the target analyte in spiked samples and also the recoveries of the surrogates in all samples and QC samples.

$$\%\ Recovery = \frac{SQ - NQ}{S} \times 100$$

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

Representativeness is the degree to which data from the project accurately represent a particular characteristic of the environmental matrix which is being tested. Representativeness of samples is ensured by adherence to standard field sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of samples should provide a representativeness of each matrix or product of the chemical processes being sampled.

Comparability is the measurement of the confidence in comparing the results of one experiment with the results of different experiments using the same matrix, sample location, sampling techniques and analytical methodologies.

Completeness: Completeness is the percentage of valid results obtained compared to the total number of samples taken for a parameter. Since sampling from inspections are usually grab and limited in number of samples, the number of valid results obtained from the analyses are expected to be equal or better than 90%. Percent completeness may be calculated using the following formula:

$$\% \text{ Completeness} = \frac{\text{\# of valid results}}{\text{\# of samples taken}}$$

The QA objectives outlined, above, will be evaluated in conjunction with the data validation process.

1.6 Special Training Requirements/ Certification

All lead UIC inspectors are required to complete the National UIC Inspector Training and have at least the 24-hour Basic Health and Safety Training. The basic health and safety training certification should be maintained current by attending an 8-hour safety training refresher course offered by USEPA each year. All other non-lead UIC inspectors are required to have at least the 24-hour Basic Health and Safety Training. All EPA inspectors must also have a signed and current “credential” certifying the bearer as “Authorized to Conduct Investigations and Inspections Pursuant to All Federal Laws Administered by the United States Environmental Protection Agency”. Furthermore, sampling and sample documentation skills are also assured by the “mentoring” provided by the senior inspectors in the field.

Additional training in confined space entry may be necessary. Confined space entry requires specialized training as described in 29 CFR 1910.146. The training should include how to identify confined spaces, atmosphere monitoring, lock-out and tag-out, retrieval systems, emergency response, and permit preparation. Any person entering a confined space must have documentation to support that they have receive d the required training. Establish protocols to ensure that new additions to the monitoring team receive the proper health and safety training. Also, the training program should include periodic “refresher” courses.

Scientists performing the analytical work for this project have extensive knowledge, skill and demonstrated experience in the execution of the analytical methods being requested.

1.7 Documentation and Records

Investigators will maintain field notes in a bound notebook and all documents, records, and data collected will be kept in a case file and submitted to the program office with the final inspection report.

The following documents will be archived at the Manchester Environmental Laboratory or the designated laboratory performing the analysis: (1) signed hard copies of sampling and chain-of-custody records (2) electronic and hard copy of analytical data including extraction and sample preparation bench sheets, raw data and reduced analytical da

The laboratory will store all sample receipt, sample login, extraction documentation, and laboratory instrument documentation per SOP.

2.0 Measurement/ Data Acquisition

2.1 Sampling Process Design (Experimental Design)

Prior to compliance inspections, the FPO and/or the CO will review and evaluate facility files, if available, which may include facility background information, historical ownership, use of the facility for waste generation, treatment, storage or disposal of solid and hazardous wastes, facility maps depicting general geographic location, property lines, surrounding land uses, a summary of all possible source areas of contamination, a summary of past permits requested and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the facility, records and inspection reports from previous compliance site visits.

During inspections, samples of opportunity will be collected for analysis to determine if the samples are in compliance with the SWDA permitting requirements, and generally, to gather data to support an enforcement action when significant violations are known, suspected or revealed in the form of a citizen tip or complaint against the facility.

UIC studies focus on determining the quality of the ground water in a target area. Sampling of the ground water in the target area provides the needed scientific data for regional decisions on impacted areas. The main considerations in developing a UIC sampling strategy are as follows:

< Identification of the pollutants in the ground water.
< Identification of the source generator.
< Delineation of the contamination plume.

Complexity of the sampling program will vary based on a number of factors. Some primary factors are as follows:

< Size of the target area.
< Hydrogeological conditions of the target area.
< Accessibility to potable and ground water monitoring wells.
< Process mode of the source generator responsible for the ground water contamination.

Whenever possible, at least one background location (possibly more) should be selected to sample ground water representative of an area that is not impacted by any source generator. Background samples should be collected prior to collection of potentially contaminated samples. Enough sampling sites should be utilized to assure a representative sampling of ground water in the target area to adequately characterize the extent of ground water contamination.

Primary impact sampling locations, should be located down gradient of the source generator and at a distance near to the source generator to isolate the contributing process mode responsible for the ground water contamination.

2.2 Location

Inspectors should use the Global Positioning System (GPS) for documenting locations of facilities and/or sites inspected. GPS instruments (Trimble GeoExplorer II) with instructions for use can be checked out through the Quality Assurance and Data Unit (Matt Gubitosa).

2.3 Potential Hazards Commonly Encountered In Sampling UIC and Storm Water

Before workers can be adequately protected, the activities must be analyzed, and the anticipated hazards to their health and safety must be identified. The following summarizes the general classes of hazards expected to be present during storm water sampling. The summary provided here is not intended to include every type of hazard that could be encountered; rather, it is intended to serve as a starting point for a site-specific analysis for a given project. The following provides an overview of the hazards commonly encountered in sampling storm water and the safety precautions and protective measures typically used to minimize the hazards described. This guidance is general in nature and not comprehensive and is not a substitute for a detailed, site-specific evaluation, or established safety regulations. It should also be noted that effective communication can enhance the health and safety of monitoring personnel. Cellular phones can be especially useful in this regard. If field personnel encounter unusual conditions, or are unclear as to how to deal with a given situation, they can contact their health and safety officer for guidance. Also, cellular phones can be used to summon help in the event of an accident or other emergency.

Confined Spaces

Storm sewers are classified as “confined spaces” under OSHA regulations. Regulations for entry into confined spaces are contained in 29 CFR 1910.146. The regulations require that no person shall enter a confined space without proper training and equipment. The risks associated with confined spaces include dangerous atmospheres, engulfment, falls, falling objects, and bodily harm due to explosion.

Protective measures include use of atmospheric monitoring devices, portable ventilators, air purifying respirators, and entrant retrieval systems. Other precautions include prohibiting entry to some sites during storms and erecting pedestrian barriers. Confined space entry standard operating procedures should be adhered to if it is necessary for any personnel to enter a confined space for storm water monitoring activities.

Physical Hazards

Physical hazards may include vehicle traffic, open maintenance holes and maintenance hole lids, and open water. Basic information is provided below regarding each of these hazards.

All field personnel should have the following personal protective equipment while working in the field:

- Hard hat
- Leather gloves (when working with maintenance hole covers, grates, and other related heavy objects, but not when handling samples or sampling equipment).
- Reflective traffic vest
- Steel-toed boots
- Eye protection
- Rain gear (during rainfall events)

This list represents the minimum protective equipment. The site-specific hazards evaluation for each project may determine that additional equipment is warranted for some sites/activities.

<u>Vehicle traffic</u>

Traffic hazards may be a primary concern at most sampling sites. These hazards are greatest during times of reduced visibility, such as during storm events and at night. The primary threats associated with working in or alongside roadways are workers being struck by passing vehicles or being involved in a vehicular collision. The risk associated with these threats is severe bodily injury or death.

Traffic should be controlled. All sampling personnel should be trained in proper traffic control including precautions and installation and use of appropriate controls. To the extent possible, try to schedule site visits for non-peak traffic periods.

<u>Open Maintenance Hole and Maintenance Hole Lids</u>

Storm sewer sampling sites are often located below grade, such that maintenance holes must be opened during water sample collection and equipment maintenance activities. Opening maintenance holes requires the removal of heavy steel lids. Improper maintenance hole lid removal techniques can result in back injuries and/or crushed toes or feet. Specially designed maintenance hole hooks along with proper lifting techniques provide the easiest and safest way for removing maintenance hole lids. Open maintenance holes pose a threat to workers and general public. Limited visibility, inattention, poor site control, slips, and/or trips could result in someone falling into an open maintenance hole. The risks of such a fall include minor to fatal bodily injury.

Maintenance hole safety precautions include both handling the heavy lids and controlling access to maintenance hole openings. Maintenance hole lids should only be moved using a hole hook; picks and crow bars are not acceptable substitutes. Maintenance hole hooks are designed not to slip while moving the lid. Safe lifting practices should be used when working with maintenance hole lids. Controlling access to maintenance hole openings can be done by erecting barriers and assigning a crew member to act as lookout and warn people away.

Open Water Hazards

High flows associated with storm events present a threat to workers. Slippery conditions, stream side vegetation, and unstable stream banks could cause a worker to fall into a stream. The risks of such a fall include hypothermia, bodily injury, and drowning.

The most effective precaution against open water hazards is to conduct work from a safe location such as bridge deck. If access to the waters edge is required, then a flotation vest and lifeline should be used.

Biological Hazards

Rodents and pathogenic microorganisms (including viruses), are potential biological hazards of concern. The primary threats associated with these hazards are injury from bites and/or the contraction of diseases.

To protect against bacterial and viral hazards, crews should avoid contact with storm water samples. The use of powder-free nitrile gloves when handling samples is recommended. Crews should wash hands with soap and water before handling any food or drink. Any animals encountered during sampling should be avoided.

Chemical Hazards

Although most storm water sewers are not intended to contain hazardous materials, there is a potential for hazardous gaseous and/or liquid contaminants to be present as the result of industrial runoff, illicit sanitary sewer connections, and/or illegal dumping of wastes. The presence of chemicals and/or chemical vapors may result in (but not limited to) one or more of the following threats: toxic conditions, oxygen displacement, explosion, and/or fire. The risks associated with these threats include poisoning (acute and/or chronic), asphyxiation, and bodily injury.

Hazardous chemicals in storm sewers can be in either the liquid or vapor phase. Precautions against the liquid phase are similar to those described for biological hazards. Precautions against chemical vapors include use of air-purifying respirators and portable ventilators.

Emergency Response/Contingency Plan

An emergency response/contingency plan must be developed prior to any sampling activities. The plan should include instruction and procedures for medical emergencies, fires/explosions, hazardous material spills, and site evacuations. All emergency conditions require concise and timely actions conducted in a manner that minimizes the health and safety risks. All monitoring personnel should be familiar with the emergency response/contingency plan.

In most instances, the health and safety officer is responsible for assessing emergency situations and contacting the appropriate emergency services if necessary. If the health and safety officer is not available, emergency assistance should be contacted immediately. All personnel should be trained in basic first aid, be familiar with proper evacuation procedures, and have access to emergency numbers and routes to the nearest medical emergency facilities from each site. Emergency numbers should include at least the following: local police and fire department (911), closest hospital, county environmental health, and Hazmat team.

2.4 Sample Collection

Sample collection methods can vary between standard operating procedures used by samplers and different conditions encountered in the field. The following is a general guidance for samplers. Whatever the case, samplers should document in their notes or field checklist the actual method used to obtain samples.

If samples are collected manually, rubber gloves should be worn to protect the sampler. Also, the use of safety glasses should be considered. Additional safety information should be covered in a site safety plan or pre-inspection safety briefing.

When a discharge point is identified, the sampler should consider collecting, when possible, samples at a minimum of three collection points. These collection points and the order they should be obtained are 1) above the discharge (last sample collected) 2) at the discharge (second sample collected) and 3) below the discharge at a point where mixing has occurred (first sample collected).

Where practical, samples will be collected by grab directly into the pre-cleaned sampling container or an intermediate pre-cleaned sample container used as a sampling device. All sample containers will be filled to approximately 90% capacity, except for VOC sample containers which will be completely filled.

If a non pre-cleaned disposable sample container is used as the sampling device, an equipment rinsate blank will be generated from this device and submitted for analysis for the same parameters for which it was used to sample. If reusable sampling equipment is used, at least one representative rinsate blank will also be generated from this equipment as described above.

All sample containers should be labeled with the date and time of collection, sample number, analysis required, location, type of preservation if any has been added in the field, and collector's name. Sample containers should be placed in an ice chest with ice and proper chain-of-custody procedures should be followed at all times.

If analysis of additional parameters is needed in a specific case, additional sample containers may be needed. Required sample volume, container type, preservation techniques, and holding times for parameters likely to be sampled are included in (table 4). <u>Inspectors should use their discretion on which parameters should be determined to document violations at a particular facility and are encouraged to discuss this with the CO or the program.</u>

<u>If fecal coliforms and E. coli will be required for analysis, the inspectors should consider the utilization of the MEL's mobile microbiology lab. Fecal coliforms , E. Coli only have 6 hours of holding time. If an on-site microbiology lab will not be used, the inspectors should make sure that the samples are hand delivered to the lab in less than 6 hours from the time of sampling.</u>

2.4.1 Sample Type: Grab And Composite Samples

To comply with storm water application requirements, the sample type (grab or composite) must be collected in accordance with 40 CFR 122.21(g)(7) and 40 CFR Part 136. The storm water application requirements clearly specify which pollutants must be analyzed by grab sample, and which by composite sample. Although the requirements in 40 CFR 122.21(g)(7) do not explicitly specify either manual or automatic sampling techniques, the approved analytical methods contained in 40 CFR Part 136 direct that grab samples must be collected manually for certain pollutants.

A grab sample is a discrete, individual sample taken within a Short period of time (usually less than 5 minutes). Analysis of grab samples characterize the quality of a storm water discharge at a given time of the discharge.

Composite samples are mixed or combined samples that is formed by combining a series of individual discreet samples of specific volumes at specified time. Although these intervals can be time weighted or flow-weighted, the storm water regulations require the collection of flow-weighted composite samples. This means that discrete aliquots of samples, are collected and combined in proportion to flow rather than time. Composite samples characterize the quality of a storm water discharge over a longer period of time, such as the duration of a storm event. Both types of samples must be collected and analyzed for storm water discharge permit applications.

Grab samples must be collected for the following conditions:

- For storm water discharges associated with industrial activity, a grab sample must be obtained during the first 30 minutes of a discharge. This requirement is in addition to the composite sampling requirements. These samples are intended to characterize the maximum concentration of a pollutant that may occur in the discharge and/or may indicate intermingling of non-storm water discharges.

- For storm water discharges from large and medium municipal separate storm sewers, grab samples are required if a discharge is noted during dry weather field screening. Two grab samples must be collected during a 24 hour period with a minimum of 4 hours between samples. These samples are intended to assist in the identification of illicit connections or illegal dumping.

  Flow-weighted composite samples must be collected during the first 3 hours of discharge or the entire discharge (if it is less than 3 hours) for both industrial and municipal applicants.

2.4.2 Pollutant Specific Requirements

The regulations at 40 CFR 122.21(g)(7) identify certain pollutants for which grab sampling is required:

- Monitoring by grab sample must be conducted for pH, temperature, cyanide, total phenols, residual chlorine, oil and grease (O&G), fecal coliform, and fecal steptococcus. Composite samples are not appropriate for these parameters due to their tendency to transform into different substances or change in concentration after a short period of time. Transformations may be likely to occur in the presence of other pollutants.

- Retention ponds with greater than a 24-hour holding time for a representative storm event may be sampled by grab sampling. Composite sampling is not necessary because the water is held for at least 24 hours, a thorough mixing occurs within the pond.

A grab sample and a flow-weighted sample must be taken for storm water discharges collected in holding ponds with less than a 24-hour retention period. The applicant must sample the discharge in the same manner as for any storm water discharge (as described in 40 CFR 122.21(g)(7)].

2.4.3 How to collect a grab sample

A manual grab is collected by inserting a container under or down current of a discharge with the container opening facing upstream. Generally, simplified equipment and procedures can be used. In most cases, the sample container itself may be used to collect the sample. Less accessible outfalls may require the use of poles and buckets to collect grab samples. To ensure that manual grab samples arc representative of the storm water discharged, the following procedures should be followed:

Recommended Operating Procedures for Collecting Grab Samples

- Take a cooler with ice to the sampling point
- Take the grab from the horizontal and vertical center of the channel
- Avoid stirring up bottom sediments in the channel
- Hold the container so the opening facing upstream
- Avoid touching the inside of the container to prevent contamination
- Keep the sample free from uncharacteristic floating debris
- Transfer samples into proper container (e.g., from bucket to sample container), however, fecal coliform, fecal streptococcus, phenols and O & G should remain in original containers
- If taking numerous grabs, keep the samples separate and labeled clearly
- Use safety precautions

Specialized equipment and procedures may be needed, particularly in situations where storm water discharges are inaccessible or where certain parameters arc monitored.

Collecting Grab Samples Using an Auto-sampler

Grab samples can be collected using automatic samplers. Some samplers come equipped with computers. Programming for grab sampling are specific to the type of auto sampler used. Some auto-samplers are portable and are specifically designed to sample for storm water discharges. These samplers are frequently attached to a rain gauge and/or a flow sensor. Such samplers can be programmed to initiate sample collection by one or more of the following conditions: (1) depth of flow in a channel; (2) rainfall in inches; (3) flow rate; (4) time; (s) external signal; and (6) combinations of the first three conditions.

When using an auto-sampler, planning is very important.. First, all equipment must be properly cleaned, particularly the tubing and the sample container. There are several different types of tubing available, including rubber, Teflon, high-density polyethylene (HDPE) and Tygon tubing. Tygon tubing is commonly used for collecting samples for metals and other inorganic parameters. Teflon tubing is highly recommended for collecting samples for organic constituents analyses to prevent phthalate contamination.. When cost restraints are involved, HDPE tubing are used for collecting samples for organic analysis instead of Teflon. De-ionized water should be drawn through the sampler to remove any remaining pollutant residuals prior to taking samples. Tubing should also be replaced periodically to avoid algae or bacterial growth. Sampling personnel should also use adequate and appropriate containers and ensure they are properly cleaned. Additionally, trip blanks are required for VOC samples ; rinsate or equipment blanks are required for all of the other organic and inorganic suite of parameters analyze. A temperature blank is also required to accompany per cooler of samples shipped . Blank analyses will verify the accuracy of analytical results and is recommended to determine if cross-contamination of sampling equipment has occurred. Samplers should also be programmed, set up, and supplied with a source of power. Properly charged batteries should be readily available for portable samplers in advance of a storm event and, as a backup power supply in case of power failure. Finally, although automatic samplers may be useful in some situations, several parameters are not amenable to collection by automatic sampler. These pollutants include fecal streptococcus, fecal coliforms, oil and grease and VOCs which should be collected manually.

Composite samples are samples simply comprised of a series of individual sample aliquots that have been combined to reflect average pollutant concentrations of the storm water discharge during the sampling period. Composite samples can be developed based on time or flow rare. There are four different types of composite samples, as follows:

- Constant Time-Constant Volume - Samples of equal volume are taken at equal increments of time and composited to make an average sample. This method in not acceptable for samples taken for compliance with the storm water permit regulations.

- Constant Time -Volume Proportional to Flow Increment - Samples are taken at equal increments of time and are composited proportional to the volume of flow since the last time sample was taken

- Constant Time - Volume Proportional to Flow Rate - Samples are taken al equal increments of time and are composited proportional to the flow rate at the time each sample was taken

- Constant Volume-Time Proportional to Flow Volume Increment - Samples of equal volume are taken at increments of flow volume and composited

2.4.4 List of Problems Usually Encountered in the Field and Recommended Solutions

Problem: Sampling where storm water commingles with process and non-process water.
Solution: Attempt to sample the storm water discharge before it mixes with the non-storm water discharge. If this is impossible, sample the discharge during both dry and wet weather and presents both data sets to permitting authorities. This will provide an indication of the contribution of pollutants from each source.

Problem: Numerous small point discharges.
Solution: Impound channel or join together flow by building a weir or digging a ditch to collect discharge at a low point for sampling purpose. This artificial collection point should be lined with plastic to prevent infiltration and/or high levels of sediment. or, sample at several locations to represent total site runoff.

Problem: Inaccessible discharge point.
Solution: Go up the pipe to sample(i.e. to the nearest manhole or injection point). If these are not available tap into the pipe or sample at several locations to best
represent total site runoff.

Problem: Managing multiple sampling sites to collect grab samples during the first 30 minutes.
Solution: Have a sampling crew ready for mobilization when forecasts indicate that a representative storm will occur or sample several different representative
events. Also, for most parameters, automatic sampler may be used to collect
samples within the first 30 minutes triggered by the amount of rainfall, the
depth of flow, flow volume or time.

Problem: Commingling of parking lot runoff with discharge associated with industrial activity.
Solution: The combined runoff must be sampled at the discharge point as near as possible to the receiving water or the parking lot drain inlet if there is one.

Problem: Sampling in manholes.
Solution: Sample in manholes only when necessary. Sampling in manholes requires training on confined space

Problem: Runoff from other property.
Solution: If possible, estimate the volume of offsite runoff contributions and offsite runon of pollutants to perform a mass balance calculation. Include this information in the permit application. If this estimation is not possible, provide a narrative discussion of the upstream site (e.g., is it developed, describe the type of facility, and the types of pollutants that may be-present on the site, etc.).

2.4 Sample Equipment

Equipment needs will vary from inspection to inspection. The list in Table 2 provides suggestions to be considered prior to leaving for the field.

Table 2 -Suggested Sample Equipment for Injection Well Sample Collection and Inspections

General	Safety	Emergency
Inspector Credentials Field Notebook Camera Waterproof Pens & Markers Clipboard flashlight Extension Sampling Pole Sample containers Ice Chest Disinfectant Solution (bleach) and Water for boots[1] Extra Set of Coveralls	Water Proof (Rubber) Boots Rain gear Rubber gloves Soap, towels, and water for Washing hands Eye protection Hard hat	First Aid Kit Phone numbers Cell Phone

2.5 Decontamination Procedures

Samples will be collected using dedicated and disposable pre-cleaned sampling devices, if possible. Inspectors will follow the proper health and safety procedures when collecting and handling samples to minimize or not to incur cont

Storm water sample containers and sampling equipment will be cleaned and prepared for field use according to the procedures set forth in 40 CFR Part 136. A summary of the procedures is presented below for plastic containers, any or all of which may be performed by the laboratory or container distributor:

- Non-phosphate detergent and tap water wash
- Tap water rinse
- 10 percent nitric acid rinse (only if the sample is to be analyzed for metals)
- Distilled de-ionized water rinse
- Total air dry.

To clean glass containers, the same steps should be taken; but, after the distilled/de-ionized water rinse, the containers should be rinsed with solvent if appropriate prior to total air drying. After the decontamination procedures have been accomplished, the sample containers should be capped or sealed with foil, and the sampling device should be protected and kept clean. It is a good idea to label sample containers after cleaning. The laboratory should keep a record of the technician performing the cleaning procedure as well as the date and time. This begins the required chain-of- custody procedure for legal custody. A chain-of-custody record accompanies each sample to track all personnel handling the sample. This record is essential to trace sample integrity in the event that quality control checks reveal problems. For this reason, as well as to avoid problems if contamination issues arise, it is suggested that the laboratory performing the analysis perform the cleaning.

2.6 Shipping Requirements

Packaging, marking, labeling, and shipping of samples will comply with all regulations promulgated by the U. S. Department of Transportation (DOT) in the Code of Federal Regulations, 49 CFR 171 -177 and International Air Transport Association (IATA) regulations. Only staff who are authorized and have received the necessary training for shipping hazardous and/or dangerous samples can ship samples by air. Ship samples to the laboratory in a cooler with ice if cooling required (see Table 4) to minimize biological growth during shipment. Sufficient ice must be provided to assure that samples remain cold until received and processed by the laboratory.

2.7 Analytical Methods Requirements

Not all parameters will be measured for each facility inspected. In some cases no samples will be taken at all, in other situations, samplers may be requested to collect additional data such as temperature, pH, turbidity, conductivity, etc.... The following is a table listing the parameters that may be analyzed for this project, the State's (WA, ID, AK and OR) Standard Criteria, the maximum contaminant levels (MCLs) , analytical method and detection limits that may be used for this project. Table 4 -Data Quality Objective Summary lists the parameters that can be measured under this plan, the accuracy, precision, preservative and holding times requirements.

2.8 Target Compounds

The primary constituent properties of concern when assessing the potential for Class V storm water drainage wells to adversely affect USDWs are toxicity, persistence and mobility. The toxicity of a constituent is the potential of that contaminant to cause adverse health effects if consumed by humans. Persistence is the ability of a chemical to remain unchanged in composition, chemical state, and physical state over time. Mobility is the rate of movement of the constituent through ground water systems. Below are lists of compounds commonly associated with storm water runoffs. These lists will assist the inspectors in making decisions on the analytical parameters that best apply to their

Table 3 - Common Pollutants and Non-industrial Pollutant Sources Associated with Storm Water Runoff

Pollutant	Potential Source
Lead	Vehicles: exhaust, tire wear (filler material) lubrication oil and grease Structures and roads: paint
Zinc	Vehicles: tire wear (filler material), oil and grease (stabilizing additive), brake pads, metal corrosion Paved Surfaces: deicing salts Structures: paint, metal, corrosion, wood preservative
Copper	Vehicles: parts wear (brakes, metal plating, bearings and bushings) diesel fuel Structures: paint, metal corrosion, wood preservative Other: pesticides
Cadmium	Vehicles: parts wear (brakes, metal plating, ,engine parts) Other: pesticides

Nickel	Vehicles: diesel fuel, lubricating oil, parts wear (brakes, metal plating, bearings and bushings) Paved Surfaces: asphalt
Manganese	Vehicles: parts wear (engine parts)
Mercury	Vehicles: fuel combustion Structures: paint Other: coal combustion
Iron	Vehicles: body rust, engine wear Structures: rust
PAHs	Vehicles: exhaust Other: Incomplete combustion
Chlorides	Paved Surfaces: De-icing salts
Sulfates	Vehicles: exhaust Paved Surfaces: road beds, de-icing salts
Nitrogen, Phosphorous	Vehicles: exhaust Other: combustion product Landscape maintenance: fertilizers Soil erosion: land disturbance, exposed soils Sewage: leaking sanitary systems, septic system
Sediments, Particulates	Soil erosion: land disturbance, exposed soils
pesticides	General Outdoor Application Structures: wood preservatives, paint
Floatables	Litter: residential, commercial, industrial, recreation Waste Disposal: residential, commercial, industrial, recreation Vegetation: leaves, branches, trunks
Bacteria	Sewage: leaking sanitary systems, septic system other: Animal droppings Soil erosion: exposed soils
Oil and Grease	Vehicles: drippings, leaks Paved Surfaces: asphalt
PCBs	Vehicles: catalyst in synthetic tires
Benzene	Vehicles: fuel Other: solvent use
Toluene	Vehicles: fuel and asphalt Other: solvent use
Chloroform	Vehicles: resulting from mixing salt, gasoline and asphalt
Oxygen Demand	Vegetation: leaves Litter: various sources Soil erosion: land disturbance, exposed soil
Phthalate, bis(2-ethyhexyl)	Structures: plasticizer Other: plasticizer

Sources: Kobringer et al., 1981; USEPA, 1995b

Table 4 - Common Potential Non-Visible Pollutants at Construction Project and the Field and Laboratory Analyses

required

Category	Potential Pollutant Source	Field Indicator of Pollutant Release	Laboratory Analysis
Line Flushing	Chlorinated water	Colorimetric kit	Residual Chlorine
Portable Toilets	bacteria, disinfectants	NA	Totla/fecal coliform
Concrete and Masonry	Acid Wash Curing Compounds concrete Rinse Water	pH meter pH meter pH meter	pH pH, alkalinity, VOCs pH
Painting	Resins Thinners Paint Strippers Solvents Adhesives Sealants	NA Phenols kit NA Phenols Kit Phenols Kit NA	SVOCs phenols, VOCs VOCs Phenols, VOCs Phenols, VOCs SVOCs
Cleaning	Detergents Bleaches Solvents	Colorimetric kit Colorimetric kit Phenols Kit	MBAs, Phosphates Residual Chlorine VOCs
Landscaping	Pesticides/herbicides Fertilizers Lime and gypsum Aluminum sulfate, sulfur	NA NA pH meter TDS, pH	Pesticides/Herbicides NO3,NH3/P NPK (TKN) Acidity/alkalinity TDS, Alkalinity
Treated Wood	Copper, arsenic, selenium	Metal Kits, if available	Metals
Soil Amendment and Dust Control	Lime, gypsum Plant Gums Magnesium chloride Calcium chloride Natural brines Lignosulfonates	pH meter NA TDS TDS TDS TDS	pH BOD Alkalinity, TDS Alkalinity, TDS Alkalinity, TDS Alkalinity, TDS

Table 5 lists the different target analytes that could be analyzed using this Generic QA Plan, the ground water standard criteria for each of Region 10's States (WA, ID, AK and OR), the maximum contaminant level (MCLs) for each analyte, the acceptable analytical method for analysis and the required detection/quantitation limits to meet standards/

Table 5- Target Compounds, Maximum Contaminant Level (MCL) and Detection Limit Requirements

	WA Criteria (mg/L)	OR Criteria (mg/L)	ID Criteria (mg/L)	AK Criteria (mg/L)	MCLs (mg/L)	Method	Detection Limits (mg/L) MEL
Inorganic Compounds (total)							
arsenic	0.05 *	0.05					
antimony					0.006	200.8/200.7 * *	0.005
barium	1.0 *	1.0			2	200.8/200.7	0.005

	WA Criteria (mg/L)	OR Criteria (mg/L)	ID Criteria (mg/L)	AK Criteria (mg/L)	MCLs (mg/L)	Method	Detection Limits (mg/L) MEL
beryllium					0.004	200.8/207	0.001
cadmium	0.01 *	0.01			0.005	2008/200.7	0.001
chromium	0.05 *	0.05			0.1	200.8/200.7	0.005
Copper	1.0	1.0			1.3	200.8/200.7	T0.005
Cyanide					0.2	335.2/335.4	0.01
Mercury	0.002 *	0.002			0.002	245.1	0.002
Lead	0.05 *	0.05			0.015	200.8/200.7	0.001
selenium	0.01 *	0.01			0.05	200.8/200.7	0.005
thallium					0.002	200.8/200.7	0.005
silver	0.05 *	0.05				200.8/200.7	
iron	0.30	0.30				200.8/200.7	
manganese	0.05	0.05				200.8/200.7	
zinc	5.0	5.0				200.8/200.7	
other metals (no MCLs)						200.7 or equivalent	varies
Conventional Parameters							
nitrate		10			10 (as N)	300.0	0.01
nitrite		10			1 (as N)	300.0	0.01
Fluoride	4.0	4.0					
chloride	250	250				300.0	
sulfate	250	250				300.0/375.2	
Total Dissolved Solids	500	500				SM2540C	
Foaming Agents	0.5	0.5				SM5540C	
pH	6.5-8.5	6.5-8.5				150.1/4500H	
Corrosivity	non-corr						
Color	15 units	15 units				SM2120B	
Turbidity						180.1/2130B	
Temperature						2550B	
Odor	3 threshold units	3 thresh units				SM2150B	
Microbiological Tests							

	WA Criteria (mg/L)	OR Criteria (mg/L)	ID Criteria (mg/L)	AK Criteria (mg/L)	MCLs (mg/L)	Method	Detection Limits (mg/L) MEL
Fecal Coliform					zero	9221B	1/100 ml
E.Coli					zero	9221F	1/100 ml
Total Coliforms *	1/100 ml	<1/100			zero	9221E	1/100 ml
Organic Compounds							
VOCs						**524.2**	
trichloroethene	3.0 ug/l	0.200			0.005	524.2	0.00025
carbon tetrachloride	0.30 ug/l	0.005			0.005	524.2	0.00025
1,2-dichloroethane	0.5 ug/l	0.005			0.005	524.2	0.00025
chlorobenzene					0.1	524.2	0.00025
dichloromethane	5 ug/l				0.005	524.2	0.00025
vinyl chloride	0.02 ug/l				0.002	524.2	0.00025
hexachlorobenzene	0.05 ug/l				0.001	524.2	0.00025
chloroform	7.0 ug/l					524.2	0.00025
chlorodibromomethane	0.5 ug/l					524.2	0.00025
1,2-dibromoethane	0.001 ug/l	0.005				524.2	0.00025
bromoform	5 ug/l					524.2	0.00025
Acrylonitrile	0.07 ug/l					524.2	0.00025
benzene	1.0 ug/l	0.005			0.005	524.2	0.00025
1,1,1 - trichloroethane *	0.20	0.200			0.2	524.2	0.00025
1,1-dichloroethene	1.0 ug/l	0.007			0.075	524.2	0.00025
dibromochloro-3-propane					0.0002	504.1	0.0002
cis-1,2-dichloroethene					0.07	524.2	0.00025
trans-1,2-dichloroethene					0.1	524.2	0.00025
1,2-dichloropropane	0.6 ug/l				0.005	524.2	0.00025
1,3-dichloropropene	0.2 ug/l					524.2	
ethyl benzene					0.7	524.2	0.00025
ethylene dibromide (EDB)	0.001 ug/l				1.0	504.1/524.2	0.00025
toluene					1.0	524.2	0.00025
tetrachloroethene	0.8 ug/l				0.005	524.2	0.00025
xylenes					10	524.2	0.00025

	WA Criteria (mg/L)	OR Criteria (mg/L)	ID Criteria (mg/L)	AK Criteria (mg/L)	MCLs (mg/L)	Method	Detection Limits (mg/L) MEL
styrene					0.1	524.2	0.00025
1,2,4 -trichlorobenzene					0.07	524.2	0.00025
1,1,2-trichloroethane					0.005	524.2	0.00025
1,4-dichlorobenzene	4.0 ug/l	0.075			0.075	524.2	0.00025
Total Trihalomethanes ***		0.100					
1,2-dichlorobenzene					0.6	524.2	0.00025
SVOCs							
benzidine	0.0004 ug/l					525.2	
benzo(a)pyrene	0.008 ug/l					525.2	
benzotrichloride	0.007 ug/l					525.2	
benzylchloride	0.5 ug/l					525.2	
bis(2-ethylhexyl)phthalate	6.0 ug/l					506/525.2	
3,3'-dichlorobenzidine	0.2 ug/l					525.2	
2,4 & 2,6 dinitrotoluene	0.1 ug/l					525.2	
carbazole	5 ug/l					525.2	
PAHs	0.01 ug/l					525.2	
1,2-diphenylhydrazine	0.09 ug/l					525.2	
hexachlorocyclohexane (alpha)	0.001 ug/l					525.2	
hexachlorocyclohexane (technical)	0.05 ug/l					525.2	
Dioxis/Furans							
HxCDDs (mix)	0.00001 ug/l					1613B	
2,3,7,8-TCDD	0.0000006 ug/l					1613B	
Pest						**508.1**	
aldrin	0.005 ug/l					508.1	
chlorthalonil	30 ug/l					508.1	
chlordane	0.06 ug/l				0.002	508.1	0.000005
heptachlor	0.02 ug/l				0.0004	508.1	0.000005
lindane	0.06 ug/l				0.0002	508.1	0.000009
heptachlor epoxide	0.009 ug/l				0.0002	508.1	0.000005
DDT (includes DDE & DDD)	0.3 ug/l					508.1	

	WA Criteria (mg/L)	OR Criteria (mg/L)	ID Criteria (mg/L)	AK Criteria (mg/L)	MCLs (mg/L)	Method	Detection Limits (mg/L) MEL
dieldrin	0.005 ug/l					508.1	
endrin *	0.0002					508.1	
methoxychlor *	0.10				0.04	508.1	0.000013
ethylene thiourean (ETU)	2.0 ug/l					509	
Dichlorvos	0.3 ug/l					507	
Herbicides							
2,4-D	0.10					515.1	
2,4,5-TP Silvex	0.01					515.1	
PCBs						**508A**	
Aroclor 1016	0.01 ug/l				0.0005	508A	0.000122
Aroclor 1221	0.01 ug/l				0.0005	508A	0.000122
Aroclor 1232	0.01 ug/l				0.0005	508A	0.000122
Aroclor 1242	0.01 ug/l				0.0005	508A	0.000122
Aroclor 1248	0.01 ug/l				0.0005	508A	0.000122
Aroclor 1253	0.01 ug/l				0.0005	508A	0.000122
Aroclor 1260	0.01 ug/l				0.0005	508A	0.000122
PBBs	0.01 ug/l				-		
Total TPH						**WDOE Method**	
Volatile Petroleum Hydrocarbon extended (VPH)					MTCA	WDOE Method	1.0
Extractable Petroleum Hydrocarbon extended (EPH)					MTCA	WDOE Method	1.0
NW- TPH extended					MTCA	WDOE Method	1.0

* - Primary Contaminants Ground Water Quality Criteria for the State of Washington [Ch.173-200-03]
** - Use 200.7 when the analyte is detected 5x higher than MDL.
*** - Total Trihalomethanes is the sum of concentrations of bromodichlormethane, dibromochlormetahane, tribromomethane (bromoform) and trichloromethane(chlorform).

2.9 Quality Control Requirements

Quality Control procedures for analyte measurements will be performed by the laboratory in accordance with the requirements specified in the methods used in the analysis.

Laboratory instrumentation will be calibrated in accordance with the analytical procedure. Laboratory instrumentation will be maintained in accordance with the instrument manufacturer's specifications and the laboratory Standard Operating procedures (SOPs).

<u>Other Quality Control Measures</u>

- Reagent water (organic free water) - reagent water required for lab analysis will be prepared at the MEL and transported to the field site, if needed. Field and equipment blanks will be submitted, as necessary.

- Refrigerator (if present)- temperature will be maintained within specified temperature ranges. Thermometers used for recording temperatures will be calibrated against NIST certified thermometer on a yearly basis. Temperatures will be read and recorded twice daily.

- Duplicates:

  Five percent of routine samples will be processed in duplicate, or a minimum of one per day that samples are received, whichever is greater.

- Sample Disposal:

  All unused water samples will be disposed of in a manner that will not result in contamination of the surrounding environment.

2.10 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The laboratory will follow their standard operating procedures for any preventative maintenance required on laboratory instruments or systems used for this project.

2.11 Instrument Calibration and Frequency

Field maintenance and calibration will be performed where appropriate prior to use of the instruments. Sampler operation will be performed in accordance with the methodologies used in sample collection and the Instrument's Operational Instructions.

The laboratory will follow the calibration procedures found in the methods listed in Table 1 or in the laborato

2.12 Inspection/Acceptance Requirements for Supplies and Consumables

All sample jars used for this project will be certified clean provided by the laboratory. Investigators will make note of the information on the certificate of analysis that accompanies sample jars to ensure that they meet the specifications and guidance for contaminant free sample containers.

2.13 Data Acquisition Requirements (non-Direct Measurements)

No historical data shall be used for the inspections.

2.14 Data Management

A field log notebook, photos, GPS location data and the Field Sample Data and Chain of Custody Data Sheets will be used to document the sampling and inspection activities. For each sample location, the following will be recorded in the notebook: facility name and address, sample number, date, time of each sample collection, physical description of each sample collection point, weather conditions, color, sample appearance, sample identifier, and measurements. The Field Sample Data and Chain of Custody Data Sheets will have the following information: site name, sample number, date, time of each sample collection, sampler's name or initials and sampling location. If applicable, a suffix l -FD will be appended to the sample identified as the field duplicate. For fixed laboratory analyses, field duplicates will be assigned a separate unique sample identifier and will be submitted 'blind' to the analytical laboratory. Analytical duplicate results will be reported with a trailing -AD (analytical duplicate) or D.

Validated laboratory results and interpretation (if necessary) will be appended to the inspection reports. Reports will be maintained as enforcement confidential documents until release is approved by the USEPA Office of Regional Counsel (ORC). Photographs and other supporting data along with the inspection report will be used to determine com
All data generated during this project will be processed, stored, and distributed according to laboratory's SOP

3.0 Assessment/Oversight

3.1 Assessments and Response Actions

3.1.1 Field/Inspection Assessments

Each lead inspector/PO will be responsible for reviewing their own field log notebooks for accuracy and completeness within 48 hours of each inspection. Sample results provided to the PO by the laboratory will be appended to the inspection reports. The PO will compare the sample information in the field log notebooks with the analytical results appended to the inspection report to ensure that no transcriptions errors have occurred.

RPDs between field duplicate and analytical duplicate measurements will be calculated by the lab. RPD's greater than the project requirements will be noted in the associated inspection reports. The PO will decide if any corrective action will be taken in the event that the RPD's exceed the project's goals. Validated laboratory data will be provided to the PO who will be responsible for appending the data to the inspection report. If evidence of non-compliance is observed, depending on the requirements of the office conducting the inspection, the PO submits the final inspection report and a CO may be assigned to further investigate the facility.

3.1.2 Laboratory Assessments

MEL and other commercial laboratories routinely perform performance checks, quarterly blind and double blind check standards to check their instrument's performance. Each method of analysis requires specific QA/QC runs that must be complied with by the laboratory performing the analysis. An internal assessment of the data and results are also routinely conducted by the appropriate supervisors and the Laboratory QA Coordinator prior to submission to the clients. Management System Reviews are conducted by the Region 10 QA Office on the regional and state laboratories every 3 years. No additional audits will be performed on the laboratory for this project.

Deviations to the QAPP shall be documented in the Sample Alteration Plan -Attachment 1. Corrective action procedures that might be implemented from QA results or detection of unacceptable data will be developed if required and documented in Attachment 2.

3.2 Reports to Management

Only the data validation reports with the properly qualified data shall be provided to the PO. If, for any reason, the schedules or procedures above cannot be followed, the PO must complete the Attachment 2-Sample Alteration Form (SAF). The SAF should be reviewed and approved by the QAO. The laboratory should be given a copy of the QAO approved SAF for reference and project file.

4.0 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The criteria for the validation will follow those specified in this QA plan and the criteria specified in the meth

4.2 Validation and Verification Methods

All data generated shall be validated in accordance with the QA/QC requirements specified in the methods, the technical specifications outlined in the QAPP and the National Functional Guidelines for Inorganic and Organic Data Review (11/99). The summary of all analytical results will be reported to the PO and CO. The raw data for the project shall be maintained by the laboratory. Data validation will be performed by the laboratory for all the analyses prior to the release of data. The laboratory will also archive the electronic and hard copy of the analytical data into their laboratory data management system.

4.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in a data report pac

Table 6 - Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks /	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Fixed Laboratory Measurements												
VOCs		1 each per batch	1 per 20	groundwater	524.2	Table 3	per method	35	90	Cool 4 C, Na2S2O3; HCl pH $\leq$ 2	2 G Teflon lined septa 40-ml VOC vials	preserve -14 days unpreserve -7 days Aromatic VOCs
VOCs		1 each per batch	1 per 20	solid/sludge	8260B	1 ppm	per method	50	90	Cool 4 C	2 G Teflon capped 2 oz vials	14 days analysis
Pest/PCB		1 each per batch	1 per 20	groundwater	508A	see Table 3	per method	35	90	Cool 4 C	2 G Teflon 1 L amber bottles	7 days extraction 40 days analysis
Pest/PCB		1 each per batch	1 per 20	Solid/sludge	8081A /8082A	1 ppm	per method	50	90	Cool 4 C	2 G Teflon capped 4 oz vials	14 days extraction 40 days analysis
metals		1 each per batch	1 per 20	groundwater	200.8/ 200.7	See Table 3	75-125%	25	90	HNO3 pH $\leq$ 2	1 P 1- L bottle	28 days mercury 6 months metals
metals		1 each per batch	1 per 20	solid/sludge	207/6010	1 ppm	75-125%	25	90	NA	1 G 8 -oz Bottles	28 days mercury 6 months metals
Fecal Coliform		1 per sample	NA	water/sludge	9221B	1 MPN/ 100 ml	1 MPN/ 100 ml	varies	95	Cool on Ice Na2S2O3 & EDTA	250 ml P	6 hours from sample collection
E. Coli		1 per sample	NA	water/sludge	9221F	1 MPN/ 100ml	1 MPN/ 100 ml	varies	95	Cool on Ice Na2S2O3 & EDTA	250 ml P	6 hours from sample collection
NW-Total TPH VPH/EPH		1 each per batch	1 per 20	water	WDOE method	see Table 3	per method	35	90	Cool 4 C	2 G Teflon lined septa 1-L Bottles	7 days extraction 40 days analysis
NW-Total TPH VPH/EPH		1 each per batch	1 per 20	solid/sludge	WDOE method	1 ppm	per method	35	90	Cool 4 C	VPH -2 G Teflon septa 4 oz bottles	14 days extraction 40 days analysis
Field Measurements												
pH		1 per 10		water	150.1		0.1 unit	20	100	NA	100 ml P, G	Analyze Immediately
Turbidity		1 per 10			180.1		0.1 NTU	20	100	NA	250 ml, P	Analyze Immediately
Temperature		1 per 10		water	2250B		NA	NA	100	Not Required	Not Required	Analyze Immediately

[1] - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.
** - Sodium Thiosulfate should only be added in the presence of residual chlorine.

Attachment 1. Sample Alteration Form

Project Name and Number: ____

Material to be Sampled: ____

Measurement Parameter:____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):
____
____
____
____

Reason for Change in Field Procedure or Analysis Variation:
____
____
____
____

Variation from Field or Analytical Procedure:
____
____
____
____

Special Equipment, Materials or Personnel Required:
____
____
____
____

Initiators Name:____________________________________ Date: ___________

Project Officer:____________________________________ Date:____________

QA Officer:_______________________________________ Date:____________

Attachment 2. Corrective Action Form

Project Name and Number:____

Sample Dates Involved: ____

Measurement Parameter:____

Acceptable Data Range:____

____

Problem Areas Requiring Corrective Action:____

____

____

____

Measures Required to Correct Problem:____

____

____

____

Means of Detecting Problems and Verifying Correction:______________________________________

____

____

____

Initiators Name:_______________________________________ Date:_____________

Project Officer:_______________________________________ Date:_____________

QA Officer:____ Date:_____________

Attachment 3: Injection Well Class V Site-Specific Inspection Plan (IWVSSIP)

This IWVSSIP will be prepared and used in conjunction with the Generic Injection Well Class V QAPP, Revision 1.0, Rev. 02/02 for collecting samples of opportunity during an announced and unannounced inspections. Please refer to the Generic QAPP for specific details regarding IWVSSIP. Note: Page 3, Table 1- Summary of DQOs : Do not remove parametersfrom this generic table. Fill in the number of samples for each applicable analysis/matrix. If the number of samples column is left blank for a particular analysis, the RSCC, QAO and LAB will presume that the analysis is not required for the project. Submit the IWVSSIP to the RSCC for laboratory coordination/sample numbers/project information and to the QAO for review and concurrence. This form can be E-mailed to castrilli.laura@epa.gov or hall.christopher@epa.gov or faxed - 206-553-8210. For more QA concerns, contact grepo-grove.gina@epa.gov .

PROJECT CODE: *0001B10P90102E - Waste Water*

Regional Sample Tracking Numbers: ________________________ to __________________________ RSCC Initials: _________________

QA Reviewer Concurrence with the IWVSSIP :___________________________ Date :___________

Print Name and Signature

STATUS: (Check)	Enforcement sensitive:		CBI		Open:		Routine:		Others:	

Site Name/Facility Type:	
Address:	
Contact Person:	
E-mail Address /Phone Number:	

AUTHORIZED INSPECTOR/FPO & COOPERATING AGENCIES INVOLVED:

Name	Agency	Phone Number

TENTATIVE PROJECT SCHEDULE

Activity	Estimated Start Date	Estimated Completion Date	Comments
Mobilize to Site			
Sample Collection			
Laboratory Receipt of Samples			
Target Completion Date			

DATA DISTRIBUTION

Name and Mail Stop	Electronic	Hard Copy

Table 1 - Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks /	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Fixed Laboratory Measurements												
VOCs		1 each per batch	1 per 20	groundwate r	524.2	Table 3	per method	35	90	Cool 4 C, Na2S2O3; HCl pH $\leq$ 2	2 G Teflon lined septa 40-ml VOC vials	preserve -14 days unpreserve -7 days Aromatic VOCs
VOCs		1 each per batch	1 per 20	solid/sludg e	8260B	1 ppm	per method	50	90	Cool 4 C	2 G Teflon capped 2 oz vials	14 days analysis
Pest/PCB		1 each per batch	1 per 20	groundwate r	508A	see Table 3	per method	35	90	Cool 4 C	2 G Teflon 1 L amber bottles	7 days extraction 40 days analysis
Pest/PCB		1 each per batch	1 per 20	Solid/sludg e	8081A /8082A	1 ppm	per method	50	90	Cool 4 C	2 G Teflon capped 4 oz vials	14 days extraction 40 days analysis
metals		1 each per batch	1 per 20	groundwate r	200.8/ 200.7	See Table 3	75-125%	25	90	HNO3 pH $\leq$ 2	1 P 1- L bottle	28 days mercury 6 months metals
metals		1 each per batch	1 per 20	solid/sludg e	207/601 0	1 ppm	75-125%	25	90	NA	1 G 8 -oz Bottles	28 days mercury 6 months metals
Fecal Coliform		1 per sample	NA	water/sludg e	9221B	1 MPN/ 100 ml	1 MPN/ 100 ml	varies	95	Cool on Ice Na2S2O3 & EDTA	250 ml P	6 hours from sample collection
E. Coli		1 per sample	NA	water/sludg e	9221F	1 MPN/ 100ml	1 MPN/ 100 ml	varies	95	Cool on Ice Na2S2O3 & EDTA	250 ml P	6 hours from sample collection
NW-Total TPH VPH/EPH		1 each per batch	1 per 20	water	WDOE method	see Table 3	per method	35	90	Cool 4 C	2 G Teflon lined septa 1-L Bottles	7 days extraction 40 days analysis
NW-Total TPH VPH/EPH		1 each per batch	1 per 20	solid/sludg e	WDOE method	1 ppm	per method	35	90	Cool 4 C	VPH -2 G Teflon septa 4 oz bottles	14 days extraction 40 days analysis
Field Measurements												
pH		1 per 10		water	150.1		0.1 unit	20	100	NA	100 ml P, G	Analyze Immediately
Turbidity		1 per 10			180.1		0.1 NTU	20	100	NA	250 ml, P	Analyze Immediately
Temperature		1 per 10		water	2250B		NA	NA	100	Not Required	Not Required	Analyze Immediately

[1] - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.
** - Sodium Thiosulfate should only be added in the presence of residual chlorine.

GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR

PCB SAMPLING AT FACILITIES

Date: February, 2002
Revision: 2.0

APPROVAL OF QAPP:

_______________________________ **Date:________**
Rick Albright, Director
Waste and Chemicals Management Office

_______________________________ **Date:________**
Barry W. Towns, Manager
QA and Data Unit, OEA

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ATTACHMENTS

Attachment 1. Sample Alteration Form

Attachment 2. Corrective Action Form

Attachment 3. PCB Site-Specific Inspection Plan

1.0 Project Management Elements

1.1 Distribution List

Copies of the completed/signed project plan should be distributed to:

Compliance Officer (CO)	Specify name & correct Mail Stop
EPA Inspector/Field Project Officer	Specify name & correct Mail Stop
RSCC	Laura Castrilli, OEA-095
QA Officer	Barry Towns, OEA-095
Laboratory Supervisory Chemist	Joe Blazevich, LAB

Electronic copies of data are not required unless specifically requested.

1.2 Project/ Task Organization

The following is a list of key project personnel and their responsibilities:

Inspector/Field Project Officer (FPO)	________________________
Program Compliance Officer (CO):	________________________
QA Officer:	Barry Towns (206) 553-1675
RSCC:	Laura Castrilli (206) 553-4323
Laboratory:	Joe Blazevich (360) 871-8705

The FPO is responsible for planning sampling design, conducting the inspection, collecting physical and doc samples, analysis coordination, and preparing the inspection report. The FPO works with the CO and membe the Region 10 Office of Regional Counsel to resolve non-compliant conditions at a Facility.

The QA Office assists the FPO and CO in the development of the Site Specific QA Project Plans (QAPPs). T QA Office also reviews and approves site specific sampling plans, its subsequent revisions and amendments.

The Regional Sample Control Coordinator (RSCC) resides in the QA Office, coordinates sample analyses performed by Manchester Environmental Laboratory (MEL). The FPO submits the PCB Site Specific Inspe Plan (PSSIP) to the RSCC and the QAO. The QAO reviews the PSSIP. The RSCC informs the laboratory of upcoming samples from the inspection and reserves laboratory space for the PSSIP submitted. The RSCC al provides samplers/inspectors with regional sample tracking numbers, custody seals and chain of custody for

The Laboratory (MEL) is responsible for conducting fixed laboratory analyses identified in Table 1 of the PS accordance with the requirements specified in the QAPP and the analytical methods. The supervisory chemi technical lead at the laboratory responsible for assigning the appropriate personnel to the project. The labora also responsible for validating laboratory generated data prior to submission to FPO.

1.3 Problem Definition/ Background

1.3.1 Background

This QAPP is prepared with an intent to provide inspectors from EPA Region 10 with basic guidelines for th collection of samples, proper sample documentation and the use of correct sampling and analytical methodo Samples collected will be sent to MEL in Port Orchard, WA or to any State accredited laboratory for analysi This document was prepared in compliance with the EPA Order 5360.1A2, the Agency required R5 documer format, "EPA Requirements for Quality Assurance Project Plans", Final Version: March, 2001, and the "USI Region 10 Expanded Guidance for Preparing Quality Assurance Project Plans", Revision 1.0 dated 12/7/98.

1.3.2 Objectives/Scope

- To determine TSCA PCB compliance through inspection and collecting samples of opportunity from facility (whose name, address and phone number are specified in the PSSIP submitted by FPO - if kno

Specific parameters are listed in Table 1 and the sample collection/design rationale section.

1.4 Project/ Task Description and Schedule

1.4.1 Project/Task Description

This Generic QA Project Plan is developed for the purpose of supporting sampling activities that may be per in conjunction with TSCA facility inspections. The samples will be analyzed at MEL. PCB Field analysis ma performed by the inspectors using immunoassay or Chlor-N-Oil Kits periodically. If analysis at MEL is not possible, analysis will be contracted to accredited commercial laboratories. Polychlorinated Biphenyls (PC be analyzed in accordance with the analytical methodology specified in Table 1 - Data Quality Objectives Su of the PSSIP. See the sample collection section and specific analyses that will be performed.

1.4.2 Schedule of Tasks

Activity	Estimated Start Date	Estimated Completion Date	Comments
PCB Site-Specific QAPP Review/Approval		1-2 working days from receipt of 3-page Site-Specific Inspection Plan*	
Mobilize to Site	See PSSIP		
Sample Collection			
Laboratory Receipt of Samples			
Laboratory Analysis		5 weeks from sample receipt	
Data Validation		2 weeks from data receipt	
Target Completion Date	See PSSIP		

1.4.3 PCB Site-Specific Inspection Plan (PSSIP)

The PCB Site-Specific Inspection Plan (PSSIP) is a two- page summary of the sampling activities that will be conducted during facility inspection. The PSSIP is submitted to the QA Office for (1) review and approval a for laboratory coordination and scheduling. The first page of PSSIP specifies the project code, sample ident numbers, the facility name, address, contact person and phone number, the names of inspectors conducting th inspection and their respective environmental organization affiliations, the tentative activity schedule, the dis list of electronic and hard copy of analytical reports and the QA reviewer's concurrence with the submitted P Page two of the PSSIP consists of a Table summarizing the analytical requirements of the inspection, the est number of samples that will be collected, the suite of parameters required for analysis, the analytical procedu methodologies that will be used and the DQO requirements of the inspection which are filled in by the FPO. applicable, Attachment I- Sample Alteration Form and Attachment II- Corrective Action Form, may also be included with the PSSIP. The PSSIP is submitted to the QA Office for review and approval before a schedule sampling event or immediately after collecting samples of opportunity. A blank 2-page PSSIP is attached at of this Generic QAPP.

1.5 Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms inspectors and project managers us describe how good the data needs to be in order to meet the project's objectives. The overall QA objective f analytical data is to ensure that data of known, needed and acceptable quality are provided. This will ensure th analytical data are reliable, scientifically sound, and defensible. To achieve this goal, data must be reviewed precision, 2) representativeness, 3) comparability, 4) accuracy (or bias) and 5) completeness.

Precision: Field precision is measured by collecting field duplicate samples at a frequency of specified in R each matrix collected and measured, and for each inspection event. With the exception of Laboratory precisi accuracy can be measured by the laboratory measuring Matrix Spike/Matrix Spike Duplicate (MS/MSD) sam and the analysis of laboratory duplicate samples. The laboratory usually performs the analysis of one set of MS/MSD and duplicate field samples per matrix measured or at a frequency specified in the PSSIP. Field an analytical precision will be evaluated by the relative percent difference (RPD) between field duplicate sampl laboratory duplicate samples; laboratory accuracy and precision will be determined by the spike recoveries an RPDs of the MS/MSD samples, respectively.

$$RPD = \frac{ABS\,(R1 - R2)}{((R1 + R2)/2)} \times 100$$

R1 = Recovery for MS or duplicate 1
R2 = Recovery for MSD or duplicate

Air Samples: Before each sampling episode, two PUF plugs from each batch of approximately twenty will be with a known amount of compounds of interest standard. The spiked plugs will remain in a sealed container a not be used during the sampling period. The spiked plugs are extracted and analyzed with the other samples a MS/MSD. The MS/MSD RPDs check the precision of analysis and determine matrix spike recoveries that indicate sample degradation checks accuracy.

Accuracy: Accuracy will be evaluated by the use percent recovery (%R) of the target analyte in spiked sampl surrogates in all samples and QC samples.

SQ - NQ

% Recovery = _____________x 100
S

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

Representativeness is the degree to which data from the project accurately represent a particular characterist environmental matrix which is being tested. Representativeness of samples is ensured by adherence to stand sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of sar should provide a representativeness of each matrix or product of the chemical processes being sampled.

Comparability is the measurement of the confidence in comparing the results of one experiment with the re different experiments using the same matrix, sample location, sampling techniques and analytical methodolo

Completeness: Completeness is the percentage of valid results obtained compared to the total number of sa taken for a parameter. Since sampling from inspections are usually grab and limited in number, the number c results obtained from the analyses are expected to be equal or better than 95%. Percent completeness may b calculated using the following formula:

$$\% \text{ Completeness} = \frac{\#\text{ of valid results}}{\#\text{ of samples taken}}$$

The QA objectives specified, above, will be evaluated in conjunction with the data validation process.

1.6 Special Training Requirements/ Certification

All lead TSCA PCB inspectors are required to complete the Basic Inspector Training, the 24-hour health and training and a combination of PCB program-specific on-the job training to satisfy the requirements of Order The basic health and safety training certification should be maintained current by attending an 8-hour safety t refresher course offered by USEPA each year. All other non-lead TSCA PCB inspectors are required to have least the 24-hour Basic Health and Safety Training and the Basic Inspector Training. All EPA TSCA PCB inspectors must be enrolled in a medical monitoring prior to conducting inspections. All inspectors must also signed and current “credential” certifying the bearer as “Authorized to Conduct Investigations and Inspections Pursuant to All Federal Laws Administered by the United States Environmental Protection Agency”. Further sampling and sample documentation skills are also assured by the “mentoring” provided by the senior inspec the field.

Scientists performing the analytical work for this project have extensive knowledge, skill and demonstrated experience in the execution of the analytical methods being requested.

1.7 Documentation and Records

Investigators will maintain field notes in a bound notebook and all documents, records, and data collected wil kept in a case file and submitted to the program office with the final inspection report.

The following documents will be archived at the Manchester Environmental Laboratory: (1) signed hard cop sampling and chain-of-custody records (2) electronic and hard copy of analytical data including extraction a sample preparation bench sheets, raw data and reduced analytical data.

The laboratory will store all sample receipt, sample login, extraction documentation, and laboratory instrume documentation per SOP.

2.0 Measurement/ Data Acquisition

2.1 Sampling Process Design (Experimental Design)

Prior to inspections, the FPO/CO will review and evaluate facility files, if available, which include but not lir background information, ownership, treatment, storage or disposal of solid and hazardous wastes, facility ma depicting general geographic location, property lines, surrounding land uses, all production and groundwater monitoring wells, any injection well onsite or nearby, a summary of all possible source areas of contaminatio summary of past permits requested and/or received, any enforcement actions and their subsequent responses list of documents and studies prepared for the facility, records and inspection reports from previous inspecti

The inspectors will collect samples of opportunity on an "as needed" basis to determine PCB compliance wit TSCA program.

2.2 Sampling Methods Requirements

The FPO and CO shall adhere to the technical guidance and requirements of the one or more of the following documents for sample collection during RCRA inspections:

- USEPA. 1998. SW 846, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods .

- USEPA. Region 4, May, 1996. Environmental Investigations Standard Operating Procedures and Qua Assurance Manual

- USEPA. August, 1987. Compendium of Field Operations Methods. EPA/549/P-87/001A

- USEPA. November, 1991. Description and Sampling of Contaminated Soils - a Field Pocket Guide. EPA/625/12-91/002.

- USEPA, January 1999. Compendium of Methods for Toxic Organic Air Pollutants, Method TO-10A , "Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using Low Volume Poly Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection.

- Annual Book of ASTM Standards, "Standard Practice for Sampling and Analysis of Pesticides and Polychlorinated Biphenyls in Air", Method 4861-94, ASTM, Philapdelphia, PA.

- USEPA, May, 1992. Compendium of ERT Air Sampling Procedures, Polyurethane Foam (PUF) Air Sampling SOP#2069. EPA/Publication 9360.4-05

All sample containers will be supplied by the EPA Manchester Environmental Laboratory (MEL). EPA will p certification that the containers are of pre-cleaned quality. Ambient air sampling media (PUFs) shall be pre according to the method requirements and "clean certifications will also be provided by the laboratory.

Individual sample containers will be stored in a cooler and shipped with ice as the coolant. All samples will b collected and shipped with proper sample custody documentation. A temperature blank shall accompany eac cooler.

Soil samples and/or product samples will be collected on "as needed" basis for PCB compliance determinati Details of the PCB analyses, methods, quantitation limits, containers, preservation, volumes, and holding tim specified in Table 1 - Data Quality Objectives Summary attached at the end of this QAPP . All alterations or deviations from this QAPP will be documented using Attachment 1 - Sample Alteration Form. Corrective ac will be documented using Attachment 2- Corrective Action Form.

2.3 Sample Handling and Custody Requirements

2.3.1 Sampling Procedures

See Section 2.2 of this QAPP - Sampling Method Requirements.

2.3.2 Sample Custody Procedures:

Samples will be kept in the custody of EPA and/or State personnel. Region 10 Chain of Custody procedures forms will be used. Custody seals will be placed on all shipping containers.

2.3.3 Shipping Requirements:

Packaging, marking, labeling, and shipping of samples will comply with all regulations promulgated by the U. Department of Transportation (DOT) in the Code of Federal Regulations, 49 CFR 171 -177 and Internationa Transport Association (IATA) regulations. Only staff who are authorized and have received the necessary tra for shipping samples can ship samples by air.

2.3.4 Decontamination Procedures:

Samples will be collected using dedicated and disposable sampling tools. Inspection derived wastes (IDW) s collected in a capped bucket with "appropriate PCB M_L Sticker". The IDW buckets shall be obtained from M through Tony Morris. The IDW bucket "currently in use" shall be stored properly by the inspectors. Once tl bucket is full, it will be submitted to MEL for proper disposal.

2.4 Analytical Methods Requirements

The PCB Target Compounds are: Aroclors 1016, 1221, 1232, 1242, 1248, 1254 and 1260. Quantitation lim are dependent on the matrix and methods used in the analysis. The estimated number of samples and the proj quantitation limit requirements are specified in Table 1 of the PSSIP. Monitoring shall be conducted in accc with EPA and/or TSCA approved analytical procedures. See Table 1 for specific methods, detection limits, e applicable to this project.

Methods of Reporting for wipe samples: The laboratory will report wipes sample results as "total microgram It is the responsibility of the inspector/s to calculate and report the approximate micrograms of PCB per are sampled (ug/cm^2) in their final inspection report.

2.5 Quality Control Requirements

Quality Control procedures for analyte measurements will be according to the requirements specified in SW

For PCB wipes: For each lot of hospital grade wipes used in collecting PCBs, a lot blank shall be analyzed to that the whole lot of wipes purchased are free of contaminants. In addition, for every sampling event, a clean sample taken from the same lot as the samples shall be submitted to the laboratory for method blank analysis Additional two clean wipes will also be submitted for Laboratory Control and Laboratory Control Standard (LCS/LCSD) analyses (if needed).

Air Samples: One PUF cartridge from each batch of approximately twenty should be analyzed without shipm the field for the compounds of interest to serve as a process blank. During each sampling episode, at least o cartridge should be shipped to the field and returned without drawing air through the sampler, to serve as a fie blank. During the analysis of each batch of samples, at least one solvent process blank (all steps included but PUF cartridge included) should be carried through the procedure and analyzed. All blank levels should not e 10 ng per sample for single component pesticides or 100 ng/sample for PCBs.

Sampling Efficiency and Spike Recovery (Air Sampling): Before using the method for sample analysis, the la must determine its sampling efficiency for the compounds of interest. The procedure for determining sampl efficiency is discussed in Section 15.3 page 10A-17-18 of the Compendium of Methods TO10A.

Laboratory instrumentation will be calibrated in accordance with the analytical procedure. Laboratory instrumentation will be maintained in accordance with the instrument manufacturer's specifications and the l Standard Operating procedures (SOPs).

2.6 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The laboratory will follow their standard operating procedures for any preventative maintenance required on laboratory instruments or systems used for this project.

2.7 Instrument Calibration and Frequency

Field maintenance and calibration will be performed according to manufacturer's specifications where appro prior to use of the instruments.

The laboratory will follow the calibration procedures found in the methods listed in Table 1 or in the laborato SOPs.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables

All sample containers used for this project will be new and certified clean by the laboratory. Investigators wi note of the information on the certificate of analysis that accompanies sample containers to ensure that they specifications and guidance for contaminant free sample containers.

Hospital grade wipes used for PCB sampling shall be purchased by the inspectors. Per lot of wipes purchase box of 40 4" x 4" wipes) one wipe sample will be used for lot blank and analyzed by MEL for PCB contamina The analytical result for this lot blank shall be kept on file by the inspectors.

The solvents used by the inspectors in the field shall be pesticide grade and will be obtained from MEL. The solvents may include acetone, isooctane or ethanol.

2.9 Data Acquisition Requirements (non-Direct Measurements)

Data previously acquired for the facility shall only be used for historical research of the facility and not as a compliance or non-compliance determination at the time of the inspection.

2.10 Data Management

A field log notebook, photos, GPS location data and the Field Sample Data/Chain of Custody Data Sheet (FSDS/COC) will be used to document the sampling and inspection activities. For each sample location, the following will be recorded in the notebook: facility name and address, sample number, date, time of each sar collection, physical description of each sample collection point, weather conditions, color, sample appearan sample identifier, and measurements. The FSDS/COC will have the following information: site name, sampl number, date, time of each sample collection, sampler's name or initials and sampling location. If applicable l -FD will be appended to the sample identified as the field duplicate. For fixed laboratory analyses, field du will be assigned a separate unique sample identifier and will be submitted 'blind' to the analytical laboratory. Analytical duplicate results will be reported with a trailing -AD (analytical duplicate) or D.

Validated laboratory results and interpretation (if necessary) will be appended to the inspection reports. Rep will be maintained as enforcement confidential documents until release is approved by the USEPA Office of Regional Counsel (ORC). Photographs and other supporting data along with the inspection report will be use determine TSCA compliance.

All data generated during this project will be processed, stored, and distributed according to laboratory's SO

3.0 Assessment/Oversight

3.1 Assessments and Response Actions

The FPO will be required to review their field log notebooks for accuracy and completeness within 48 hours inspection. Sample results provided to the FPO by the laboratory will be appended to the inspection reports. FPO will compare the sample information in the field log notebooks with the analytical results appended to t inspection report to ensure that no transcriptions errors have occurred.

RPDs between field duplicate and analytical duplicate measurements will be calculated. RPD's greater than t project requirements will be noted in the associated inspection reports. The FPO will decide if any correctiv will be taken in the event that the RPD's exceed the project's goals. Validated laboratory data will be provide the FPO who will be responsible for appending the data to the inspection report. If evidence of non-complia observed with the data, depending on the requirements of the office conducting the inspection, the FPO subm final inspection report and an CO may be assigned to further investigate the facility.

MEL routinely performs performance checks using different program specific blind and double blind check standards. An internal assessment of the data and results are also routinely conducted by the appropriate supervisors and the Laboratory QA Coordinator. The laboratory also participates in the EPA's round robin st No additional audits will be performed on the laboratory for this project.

Corrective action procedures that might be implemented from QA results or detection of unacceptable data v developed if required and documented in Attachment 2.

3.2 Reports to Management

Only the data validation reports with the properly qualified data shall be provided to the FPO. If, for any reas the schedules or procedures above cannot be followed, the FPO must complete the Attachment 2-Sample Alteration Form (SAF). The SAF should be reviewed and approved by the QAO. The laboratory should be giv a copy of the QAO approved SAF for reference and project file.

4.0 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The criteria for the validation will follow the specifications of this QA plan and the technical acceptance crit specified in the analytical methods used.

4.2 Validation and Verification Methods

All data generated shall be validated by the laboratory in accordance with the QA/QC requirements specified methods and the Functional Guidelines for Organic Data Review, 11/99 and the technical specifications of th analytical methodology used. The summary of all analytical results will be reported to the FPO and CO. The data for this project shall be maintained by the laboratory. Data validation will be performed by the laborator all the analyses prior to the release of data. The laboratory will also archive the analytical data into their labo data management system.

4.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in a data report pa

Table 1 - Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Trip Blanks / Equipment Rinsate Blank	MS / MSD Samples	Matrix	EPA Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Laboratory Measurements												
PEST/PCBs		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	soil	8082	1 ppm	50-150	50	85	ice	4 oz wide-mouth glass jar	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	water	8082	1 ppm	50-150	50	85		1 Liter	7 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	wipes	8082	total ug/wipe	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	concrete	8082	1 ppm	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	oil	8082	1 ppm	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	PUF	TO10A	1 ppm	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
Field Measurements												
PCB screen		1 dup per batch	1/20 or 1 per batch	transformer oil	9079	5 ppm	50-150	50	85		glass jars	Analyze in the field No HT
pH		1 dup per batch	1/20 or 1 per batch	solid/ liquid	9045C	NA	± 0.1 pH Unit	± 0.1 pH Unit	100%	None Required	Field Sample Container	Analyze Immediately

1 - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.
NOTE: Include one temperature blank per ice chest shipped.

Attachment 1. Sample Alteration Form

Project Name and Number: ____

Material to be Sampled: ____

Measurement Parameter:____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):
____
____
____
____

Reason for Change in Field Procedure or Analysis Variation:
____
____
____
____

Variation from Field or Analytical Procedure:
____
____
____
____

Special Equipment, Materials or Personnel Required:
____
____
____
____

Initiators Name:______________________________________ Date: ____________

Project Officer:______________________________________ Date:____________

QA Officer:____ Date:____________

Attachment 2. Corrective Action Form

Project Name and Number:____
Sample Dates Involved: ____
Measurement Parameter:____

Acceptable Data Range:____
____
Problem Areas Requiring Corrective Action:____
____
____
____

Measures Required to Correct Problem:____
____
____
____
Means of Detecting Problems and Verifying Correction:_______________________________________
____
____
____

Initiators Name:_____________________________________ Date:_____________

Project Officer:_____________________________________ Date:_____________

QA Officer:____ Date:_____________

Attachment 3: TSCA PCB Site-Specific Inspection Plan (PSSIP)

This PSSIP will be prepared and used in conjunction with the Generic PCB QAPP, Revision 1.0, Rev. 01/02 for collecting samples of opportunity during an announced and unannounced inspections. Please refer to the Generic QAPP for specific details regarding PSSIP. Note: Page 2, Table -1 DQOs : Do not remove analytes from this generic table. Fill in the number of samples for each applicable analysis/matrix. If the number of samples column is left blank for a particular analysis, the RSCC, QAO and LAB will presume that the analysis is not required for the project. Submit the PSSIP to the RSCC for laboratory coordination/sample numbers/project information and to the QAO for review and concurrence. This form can be E-mailed to castrilli.laura@epa.gov or hall.christopher@epa.gov or faxed - 206-553-8210.

Project Account Code	**Sample Numbers**	**EPA Inspectors/Phone Numbers/Mail Stop**

Site Name/Facility Type:	
Address:	
Contact Person:	
E-mail Address /Phone Number:	

COOPERATING AGENCIES/PARTIES INVOLVED:

Contact Person	Agency	Phone Number

TENTATIVE PROJECT SCHEDULE

Activity	Estimated Start Date	Estimated Completion Date	Comments
Mobilize to Site			
Sample Collection			
Laboratory Receipt of Samples			
Target Completion Date			

DATA DISTRIBUTION

Name and Mail Stop	Electronic	Hard Copy
Dan Duncan, WCM-128		

FOR QAO REVIEW ONLY

*QA Reviewer Concurrence with the PSSIP :*______________________________ *Date :*_____________

Print Name and Signature

If the QA reviewer has concerns and comments, a signed copy of the comments should be sent to the FPO, CO, RSCC and the laboratory. The comments should be attached to the project file.

Table 1. Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Trip Blanks / Equipment Rinsate Blank	MS / MSD Samples	Matrix	EPA Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Laboratory Measurements												
PEST/PCBs		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	soil	8082	1 ppm	50-150	50	85	ice	4 oz wide-mouth glass jar	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	water	8082	1 ppm	50-150	50	85		1 Liter	7 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	wipes	8082	total ug/wipe	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	concrete	8082	1 ppm	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	oil	8082	1 ppm	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
PEST/PCB		1 dup/ 1 rinsate per day of sample collection	1/20 or 1 per batch	PUF	TO10A	1 ppm	50-150	50	85		wide mouth glass jars	14 days extraction 40 days analysis
Field Measurements												
PCB screen		1 dup per batch	1/20 or 1 per batch	transformer oil	9079	5 ppm	50-150	50	85		glass jars	Analyze in the field No HT
pH		1 dup per batch	1/20 or 1 per batch	solid/ liquid	9045C	NA	± 0.1 pH Unit	± 0.1 pH Unit	100%	None Required	Field Sample Container	Analyze Immediately

1 – Sample number includes QA samples and Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.
NOTE: Include one temperature blank per ice chest shipped.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR MINING FACILITIES

APPROVAL OF QAPP:

___________________________________ Date: _____________
Dave Tomten, Project/Field Operations Coordinator

___________________________________ Date: ______________
Robert Grandinetti, Project Manager
NPDES Compliance Unit, OW

____________________________________ Date: ______________
Bub Loiselle, Manager
NPDES Compliance Unit, OW

_____________________________________ Date:_______________
Barry W. Towns, Manager
QA and Data Unit, OEA

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Attachments

Attachment 1 - Sample Alteration Form
Attachment 2 - Corrective Action Form
Attachment 3 - Mining Facility Site-Specific Inspection Plan (MFSSIP)

1.0 Project Management Elements

1.1 Distribution List

Copies of the completed/signed project plan should be distributed to:

Project Compliance Officer (CO)	Robert Grandinetti, OW
EPA Inspector/ Project Coordinator (PO)	Dave Tomten, IOO
RSCC	Laura Castrilli, OEA-095
QA Officer/or Designee	Barry Towns, OEA-095
Lab Supervisory Chemist	Joe Blazevich, LAB

Electronic copies of data are not required unless specifically requested.

1.2 Project/Task Organization

This section identifies the personnel involved in Idaho mining facility inspections, sampling and analytical acti defines their respective responsibilities in the project.

The following is a list of key project personnel and their responsibilities:

Inspector/Project Officer (Inspector):	Dave Tomten (208) 378-5763__________
Regional Sample Control Center (RSCC):	Laura Castrilli (206) 553-4323
QA Officer (QAO):	Barry Towns/or Designee (206) 553-1675
Laboratory (MEL):	Joe Blazevich (360) 871-8705

Inspector - The inspector conducts the inspection under the authority provided by the Clean Water Act. The inspector's responsibility is to prepare a final inspection report to be submitted to the immediate program ma based on the results of the inspection conducted and the sample analytical data obtained from the laboratory. I conjunction, the inspector shall also be responsible for:

- Site inspection and recording observations in a note book;
- Documenting the location of site using GPS;
- Conducting dye tracer tests if appropriate;
- Conducting direct readings such as pH, temperature, dissolved oxygen, etc... if appropriate;
- Collecting water or effluent samples if appropriate;
- Coordinating with the Regional Sample Control Center (RSCC) for regional sample numbers;
- Coordinating with the mobile EPA laboratory for sample analysis;

- Maintaining sample documentation, including chain of custody, photographs, and receiving sample anal results.

All of these tasks shall be performed in accordance with the approved Site Specific QA Plan for mining facilit inspections in Idaho. Changes in procedure should be documented in an appropriate addendum to the plan or s alteration form included with the site specific inspection plan.

Regional Sample Control Center (RSCC) - RSCC resides within the Region 10 QA Office. The role of RSCC i coordinate and schedule sample delivery and analysis with the regional laboratory based on the information pr the inspector in the Site Specific Inspection Plan Form (see attachment 1). For sample tracking, the RSCC al provides the inspector with the regional sample numbers and the corresponding project work and account num

QA Officer - The QAO assists the PO and CO in the development of the Site Specific QA Project Plans (QAP The QA Office also reviews and approves site specific sampling plans, its subsequent revisions and amendmen

Laboratory - The Laboratory, Manchester Environmental Laboratory (MEL) located at Port Orchard, WA, is responsible for conducting laboratory analyses identified in Table 1 of the MFSSIP in accordance with the requirements specified in the QAPP and the analytical methods. The supervisory chemist is the technical lead laboratory responsible for assigning the appropriate personnel to the project. The laboratory is also responsib validating laboratory generated data prior to submission to PO.

1.3 Problem Definition/Background

1.3.1 Background

Water pollution degrades surface waters making them unsafe for drinking, fishing, swimming, and other activi authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit pro controls water pollution by regulating point sources that discharge pollutants into waters of the United States. facilities are point sources and are regulated under Section 402 of the Clean Water Act and NPDES regulatio Mining facilities are also included in several of the 11 categories of "storm water discharges associated with i activity" [40 CFR 122.26 (b)(14)(i)-(xi)]. Mining facilities primarily engage in the production of ores, conce more refined products. For example, phosphate mines in SE Idaho produce ore which is, in turn, used for the production of fertilizer products, phosphoric acid, super-phosphates or other manufactured phosphate compo chemicals. Hard rock mine sites may produce concentrates (*e.g.*, molybdenum concentrates) or more refined (*e.g*, gold ore) for off-site shipment. Mine sites typically consist of many of the following basic components haul roads, crushing and loading facilities, milling and other processing facilities, tailings ponds, heap leach fa waste rock dumps, sedimentation ponds, surface water runon/runoff controls, pit de-watering operations, mai facilities (including truck wash bays), and various best management practices. Discharges from some mine c (*e.g.*, discharges generated by runoff from land and impervious areas such as haul roads, parking lots, and build rooftops during rainfall and snow events) are regulated under storm water general permits. Discharges of poll waters of the US that are not authorized by a storm water general permit (*e.g.*, process waste water, contamina seepage from dumps) are generally prohibited, unless specifically authorized by an individual permit.

EPA routinely conducts inspections of these facilities. During the inspections, "samples of opportunity" may collected. Analytical results obtained during inspections may be used to determine compliance with statutes and establish background or ambient concentrations in receiving waters. Results may also be used to support legal action under the Clean Water Act.

The purpose of this Generic Quality Assurance Project Plan (QAPP), therefore, is to provide Inspectors from 10 State Offices with a basic Quality Assurance Project Plan (QAPP) that will address the project required Da Quality Objectives and provide guidelines on sample collection, sample documentation, analytical methods ar validation and interpretation of data deliverables. This document was prepared in compliance with the EPA Or 5360.1A2, the Agency required R5 document format, "EPA Requirements for Quality Assurance Project Plan Version: March, 2001, and the "USEPA Region 10 Expanded Guidance for Preparing Quality Assurance Proje Plans", Revision 1.0 dated 12/7/98.

1.3.2 Objective/Scope

Determine compliance with the Clean Water Act through the collection of samples of opportunity from the fa inspected.

1.4 Project/Task Description and Schedule

1.4.1 Project/Task Description

This Generic QA Project Plan is developed for the purpose of supporting mining facility inspections and samp activities that may be performed in conjunction with the Clean Water Act and NPDES programs. The samples analyzed by MEL in accordance with the analytical methodologies specified in Table 1 - Data Quality Objectiv Summary of the MFSSIP. See the sample collection section and specific analyses that will be performed.

All of the analyses will be performed in accordance with the analytical methodology specified in Table 1 - Da Objectives Summary of the MFSSIP. See the sample collection section and specific analyses that will be perf

1.4.2 Schedule of Tasks *

Activity	Estimated Start Date	Estimated Completion Date	Comments
Obtain block of numbers from RSCC	See MFSSIP		
Mobilize to Sites			
Sample Collection			
On-site Analysis of Samples			
Data Validation			
Target Completion Date			

* Note: Since most of the inspections are unannounced and the facilities nor the parameters of concern are unknown, the inspectors are allowed to submit the Site Specific Inspection QA Plan within 30 days from the last day of sample collection.

1.4.3 Mining Facilities Site-Specific Inspection Plan (MFSSIP)

The Mining Facilities Site-Specific Inspection Plan (MFSSIP) is a two-page summary of the sampling, analysi requirements that may be performed during facility inspections. The MFSSIP is submitted to the QA Office b sampling to obtain lab space at MEL or within 30 days from the last day of sample collection. The first page o MFSSIP contains the project, the account code, EPA sample numbers assigned for inspection, list of facilitie inspected, address, contact person and phone number, the names of inspectors conducting the inspection, thei respective environmental organization affiliations, the total number of samples collected per facility, the para were determined. The second page of MFSSIP consists of a Table summarizing the analytical requirements of inspection, the number of samples collected, the parameters for analysis, the analytical procedure and metho that will be used and the Data Quality Objectives (DQOs) requirements of the inspection which are filled in by Inspector. If applicable, Attachment 1 - Sample Alteration Form and Attachment 2 - Corrective Action Form, also be included with the MFSSIP. The MFSSIP is submitted to the QA Office for review and approval before scheduled sampling event or immediately after collecting samples of opportunity. A blank 2-page MFSSIP is at the end of this Generic QAPP.

1.5 Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms inspectors and project managers use describe how good the data needs to be in order to meet the project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, compar and measurement range. The overall QA objective for analytical data is to ensure that data of known and accep quality are provided. To achieve this goal, data must be reviewed for 1) representativeness, 2) comparability, precision, 4) accuracy (or bias), and 5) completeness. Precision, accuracy, completeness, sample representat and data comparability are necessary attributes to ensure that analytical data are reliable, scientifically sound, defensible. Each analytical result or set of results generated should be fully defensible in any legal action, wh administrative, civil or criminal.

<u>Precision:</u> The precision of each test depends on the number of tubes used for the analysis. The method that for the CAFO analysis (SM 9221) utilizes a confidence limit of 95 %. Samples in duplicate will be analyzed of samples collected. The precision can be evaluated by the Relative Percent Difference (RPD) between the samples.

<u>Accuracy:</u> This is not true relative to microbiology. The method has a detection limit of 1 MPN/100 ml. Fo parameters analyzed in the fixed laboratory, accuracy will be evaluated by the use percent recovery (%R) of th analyte in spiked samples and also the recoveries of the surrogates in all samples and QC samples.

$$\% \text{ Recovery} = \frac{SQ - NQ}{S} \times 100$$

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

<u>Representativeness</u> is the degree to which data from the project accurately represent a particular characteristi environmental matrix which is being tested. Representativeness of samples is ensured by adherence to standa sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of sam should provide a representativeness of each matrix or product of the chemical processes being sampled.

<u>Comparability</u> is the measurement of the confidence in comparing the results of one experiment with the resu different experiments using the same matrix, sample location, sampling techniques and analytical methodolog

<u>Completeness:</u> Completeness is the percentage of valid results obtained compared to the total number of sam taken for a parameter. Since sampling from inspections are usually grab and limited in number of samples, the of valid results obtained from the analyses are expected to be equal or better than 85%. % Completeness may calculated using the following formula:

$$\% \text{ Completeness} = \frac{\text{\# of valid results}}{\text{\# of samples taken}} \times 100$$

The QA objectives outlined, above, will be evaluated in conjunction with the data validation process.

1.6 Special Training Requirements/Certification

Inspectors are required to complete the 24-hour Basic Health and Safety training. The inspectors will obtain a health and safety training certification from the 24-hour training which should be maintained current by attend hour safety training refresher course every year. The inspectors must also have a signed and current "credenti certifying the bearer as "Authorized to Conduct Investigations and Inspections Pursuant to All Federal Laws Administered by the United States Environmental Protection Agency". All of the training courses listed abov provided by EPA Region X. Furthermore, sampling and sample documentation skills are also assured by the "mentoring" provided by the senior inspectors in the field.

Scientists (Microbiologists/Chemists) performing the analytical work for this project have extensive knowled and demonstrated experience in the execution of the analytical methods being requested.

1.7 Documentation and Records

Complete documentation for inspections may include, but are not limited to, the following forms which have t completed and collated by the EPA Inspector:

Investigation Report
Records Inspection Checklist
Chain of Custody Logs
Record of Sampling
Laboratory Analysis Reports
Photographs, Sketches, Paper Copies, Chemical Labels, MSDS, Application Records or other documentati
Region 10 Inspection Conclusion Data Sheet

Investigators will maintain field notes in a bound notebook and all documents, records, and data collected will in a case file and submitted to the program office with the final inspection report.

The following documents will be archived at the Manchester Environmental Laboratory or the designated labo performing the analysis: (1) signed hard copies of sampling and chain-of-custody records (2) electronic and h of analytical data including extraction and sample preparation bench sheets, raw data and reduced analytical dat

The laboratory will store all sample receipt, sample login, extraction documentation, and laboratory instrumen documentation per SOP.

2.0 Measurement/ Data Acquisition

2.1 Sampling Process Design

Prior to compliance inspections, the EPA Inspector will review and evaluate facility files, if available, which r include facility background information, historical ownership, facility maps depicting general geographic loca property lines, surrounding land uses, a summary of all possible source areas of contamination, a summary of permits requested and/or received, any enforcement actions and their subsequent responses and a list of docur studies prepared for the facility, records and inspection reports from previous compliance site visits.

Based on the data and visual inspection of the facility, samples of opportunity on an "as needed" basis will be for analysis to characterize the pollutants and determine if they are in compliance with the Clean Water Act.

2.2 Inspection and Sample Collection Procedures

2.2.1 Location

Locations of samples will be based on conditions found at the site, and will consider site-specific factors inclu observation of discharges, threats of discharges, presence of waste streams that contribute or may contribute t going or threatened discharges, or other factors. Examples of samples of opportunity include water samples at outfalls, in tailings ponds, sedimentation or settling ponds, receiving streams above or below outfalls, and o locations.

Inspectors should use the Global Positioning System (GPS) for documenting locations of facilities inspected. calibrated GPS instrument can be checked out through the Quality Assurance and Data Unit. Instructions on th GPS is included in Attachment 4.

2.2.2 Sample Collection

<u>General Information</u>: Sample collection methods can vary between standard operating procedures used by sar and different conditions encountered in the field. The following is as general guidance for samplers. Whatev samplers should document in their notes or field checklist the actual method used to obtain samples.

Samples should be collected using disposable sampling devices and equipment like trowels, bowls, spoons, etc samples are collected manually, rubber gloves should be worn to protect the sampler. Also, the use of safety should be considered. Additional safety information should be covered in a site safety plan or pre-inspection briefing.

When a discharge is identified, the sampler should attempt to collect a sample of the effluent at or prior to the which it enters a water of the US. More sample collection points (*e.g.*, upstream, downstream after mixing) m collected by the inspector if necessary.

To the extent possible, the sampling will start at the sampling point the farthest down stream and will proceed up to the farthest up-stream sample point so that silt stirred up by wading into the stream will not end up in the containers and positively bias the data.

Containers collected from a given sampling point will be assigned a common EPA lab number which will be m the container cap and on the side of the container. Each sampling point will receive a separate EPA lab numbe duplicates and blanks will all be assigned separate unique EPA lab numbers. In addition, dissolved (filtered) m aliquots will be assigned separate unique EPA lab numbers as labs cannot use the same sample number to repo sets of similar data (total vs. dissolved metals).

The analytical parameter name or abbreviation will be marked on the cap and on the side of the container. Abbreviations may include: TM for total metals; DM for dissolved metals; Turb for turbidity; Set Sol. for set solids; and TSS for total suspended solids.

All metals samples will be chemically preserved in a controlled manner in the field.

All TSS and total metals sample containers will be supplied through the EPA Region 10 Lab. These will consi quart/liter Cubitainers purchased as pre-cleaned containers. The bottle supplier will be required to supply anal data showing that the supply of cubitainers has been analyzed and shown to have no metals contamination abov required detection limits before supplying the containers. Except for the selenium, the detection limit by the container vendor (ESS) is 6 ug/L (1 ug/L above the required detection limit).

One TSS, one total metals, and one dissolved metals field duplicate sample will be collected and submitted bli lab. No equipment (filtered) blanks will be sent to the lab.

<u>Total Metals Sampling Procedures:</u> Cubitainers should be held by hand when collecting samples. Samples sh taken from a well mixed location by pointing the neck of the cubitainer upstream and downwards - submerging below the surface of the water. The bottom of the container should be pushed down under the water as the co fills. If sampling requires the sampler to enter the stream, the sampler should be downstream of the sample lo Should it be necessary to use a clean unused cubitainer as a 'scoop' to obtain sufficient sample, it should be th rinsed with stream water and used only for sample taking purposes at one location. To prevent sample cross-contamination due to 'dirty hands', disposable talc free gloves will be used at each sample collection point pri collection of metals samples. Containers will be pre-rinsed at least once with the sample and then submerged with sample.

<u>Dissolved metals sampling and filtration procedures:</u> A field filtration method developed at the EPA Manches Laboratory is the filtration method that will be used. This filtration procedure is simple to implement but has fully tested for water quality criteria analyses. An initial analysis of the filter cartridge and tubing has shown t (mercury was not analyzed) were not present at levels above the required detection limits. Two clean cubitai connected by two disposable short pieces of tubing with a disposable 0.45 μm accordion folded filter cartridg between the pieces of tubing. The filter cartridge in this apparatus is unlikely to clog if there is some particul samples as there is more surface area to the filter. The first container is filled with unfiltered sample, a 'tap' c affixed to the filled container and then connected via tubing to the filter cartridge (which is connected by anot of tubing to the receiving container) and then the water is forced through the filter by squeezing the cubitainer cartridge, tubing, tap cap and first collection container are all disposed of after collection is completed at one No sample contact equipment is re-used at other sample locations. The tubing will be pre-cut and if possible a to the filter.

Potential problem/resolution: it is slightly possible that the filter will clog up on very turbid samples. It is ant only effluent samples will be turbid and most likely only a sub-set of the effluent samples will be turbid. The filtration apparatus is around $15. It will not be economically possible to use multiple apparatus on samples. occurs, a clean cubitainer will be used to collect an un-filtered, un-preserved (but iced) sample aliquot that wil shipped to the lab for lab filtration and preservation.

It is understood that lab filtration and preservation will result in data that is not quite dissolved metals data. Th will be of unknown bias. This is because some dissolved metals may adsorb to the walls of the container and v be put through the filtration process (low bias). However, some metals adhering to the particulates in the sam through bacterial action go into solution, possible high bias in the dissolved metals data.

Transfer blank: Each inspector will be provided a single transfer blank for each facility to be inspected and an sterile bottle. Half way through the sample collection for each facility, transfer the contents of the full bottle bottle. Be careful not to contaminate the inside of the bottle or cap during transfer. Label this bottle with date of transfer, name of collector, sample number and label the bottle as a TRANSFER BLANK.

If analysis of additional parameters is needed in a specific case, additional sample containers may be needed. sample volume, container type, preservation techniques, and holding times for parameters likely to be sampled included in (Table 3). Inspectors should use their discretion on which parameters should be used to document violations at a particular facility and are encouraged to discuss this with representatives of the NPDES progra

2.2.3 Sample Equipment

Equipment needs will vary from inspection to inspection. The list in Table 2 provides suggestions to be consi prior to leaving for the field.

Table 2 -Suggested Sample Equipment for Field Inspections

General	Safety	Emergency
Inspector Credentials Field Notebook Camera Waterproof Pens & Markers Clipboard flashlight Extension Sampling Pole Sample containers Ice Chest Extra Set of Coveralls	Water Proof (Rubber) Boots Rain gear Rubber gloves Soap, towels, and water for washing hands Eye protection Hard hat	First Aid Kit Phone numbers Cell Phone

2.2.4 Shipping Requirements

Packing, marking, labeling, and shipping of samples will comply with all regulations promulgated by the U.S. Department of Transportation (DOT) in the Code of Federal Regulations, 49 CFR 171-177 and the Internation Transport Association (IATA) regulations. Generally, water samples will be packed with ice in coolers and shi Federal Express overnight delivery to MEL. Sufficient ice will be provided to assure that samples remain colc received and processed by the laboratory.

2.2.5 Sample Custody

Samples will be kept in the custody of EPA personnel at all times. Region 10 Chain of Custody procedures ar will be used. Custody seals will be placed on all shipping containers.

2.2.6 Decontamination Procedures

No decontamination is foreseen for water samples. Samples will be collected using disposable sampling devi sample collection gear. Inspectors will follow the proper health and safety procedures when collecting and har samples to minimize or not to incur contamination.

2.3 Analytical Methods Requirements

Not all parameters will be measured for each facility inspected. In some cases, samples will not be taken at al 1 -Data Quality Objective Summary lists the parameters that can be measured under this plan, the accuracy, pr preservative and holding times requirements.

2.4 Quality Control Requirements

Quality Control procedures for analyte measurements will be according to the requirements specified in the m will be used in the analysis.

Laboratory instrumentation will be calibrated in accordance with the analytical procedure. Laboratory instrum will be maintained in accordance with the instrument manufacturer's specifications and the laboratory Standar Operating procedures (SOPs).

Other Quality Control Measures

- Media, reagents and water: Media and reagent water required for field analysis will be prepared at the MEI transported to the field site.
- Duplicates: Five percent of routine samples (1 per batch of 20) will be processed in duplicate, or a minim per day that samples are received, whichever is greater. A duplicate sample is performed from the same sa bottle.
- Temperature Blank: A temperature blank is a liquid in a bottle used as sample shipping cooler temperature indicator and is sent with each cooler shipped. This temperature of the liquid in the bottle is measured upc opening the cooler and prior to unpacking the samples or removing the packing materials.
- Sample Disposal: All unused water samples will be disposed of in a manner that will not result in contami the surrounding environment.

2.5 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The laboratory will follow their standard operating procedures for any preventative maintenance required on la instruments or systems used for this project.

2.6 Instrument Calibration and Frequency

Field maintenance and calibration will be performed where appropriate prior to use of the instruments. Calibra samplers will be performed in accordance with the methodologies used in sample collection and the Instrume Operational Instructions.

The laboratory will follow the calibration procedures found in the methods listed in Table 1 or in the laborator

2.7 Inspection/Acceptance Requirements for Supplies and Consumables

All sample containers used for chemical analysis in this project will be new, certified clean, and provided by th laboratory. Inspectors will make note of the information on the certificate of analysis that accompanies samp ensure that they meet the specifications and guidance for contaminant free sample containers.

2.8 Data Acquisition Requirements (non-Direct Measurements)

Not Applicable.

2.9 Data Management

A field log notebook, photos, GPS location data, and the Field Sample and Chain of Custody Data Sheets may l used to document the sampling and inspection activities. Information will be recorded in the notebook to docu sample collection activities. The Field Sample and Chain of Custody Data Sheets will have the following infor site name, sample number, date, time of each sample collection, sampler's name or initials and sampling locat applicable, a suffix l -FD will be appended to the sample identified as the field duplicate. For fixed laboratory field duplicates will be assigned a separate unique sample identifier and will be submitted 'blind' to the analyti laboratory. Analytical duplicate results will be reported with a trailing -AD (analytical duplicate) or D.

All inspection reports including those for potential enforcement cases will be completed <u>within 30 days of in date</u>. Validated laboratory results and interpretation (if necessary) will be appended. Reports will be maintain enforcement confidential documents until release is approved by the US EPA Office of Regional Counsel (OF formal legal action is anticipated and ORC staff have not been assigned a case, then the NPDES Compliance U Compliance Officer may approve release of inspection reports. Photographs and other supporting data along v inspection report will be used to determine NPDES compliance.

All data generated during this project will be processed, stored, and distributed according to laboratory's SOP

3.0 Assessment/Oversight

3.1 Assessments and Response Actions

The EPA Inspector will be responsible for reviewing field log notebooks for accuracy and completeness withi hours of each inspection. Sample results provided to the EPA Inspector by the laboratory will be appended to inspection reports. The EPA Inspector will compare the sample information in the field log notebooks with th analytical results appended to the inspection report to ensure that no transcriptions errors have occurred.

With the exception of the microbiological analyses, RPDs between field duplicate and analytical duplicate measurements will be calculated by the laboratory. RPD's greater than the project requirements will be noted associated inspection reports.

Laboratories routinely perform performance checks using different program specific quarterly blind and doul check standards. Each method of analysis requires specific QA/QC runs that must be complied with by the lab performing the analysis. An internal assessment of the data and results are also routinely conducted by the ap supervisors and the Laboratory QA Coordinator. No additional audits will be performed on the laboratory for project.

Corrective action procedures that might be implemented from QA results or detection of unacceptable data wi developed if required and documented in Attachment 2.

3.2 Reports to Management

Only the data validation reports with the properly qualified data shall be provided to Mr. Dave Tomten of the Id Operations Office (IOO). If, for any reason, the schedules or procedures above cannot be followed, the EPA Inspector must complete the Attachment 1- Sample Alteration Form (SAF). The SAF should be reviewed and approved by the QAO. The laboratory should be given a copy of the QAO approved SAF for reference and pro file.

4.0 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The criteria for the validation will follow those specified in this QA plan and the criteria specified in the meth

4.2 Validation and Verification Methods

All data generated shall be validated in accordance with the QA/QC requirements specified in the methods, anc technical specifications outlined in the QAPP. The summary of all analytical results will be reported to the EI Inspector and the NPDES compliance officer. The raw data for this project shall be maintained by the laborato Data validation will be performed by the laboratory for all the analyses prior to the release of data. The laborat also archive the analytical data into their laboratory data management system.

4.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in a data report pacl

Table 1. Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Lot Blanks/	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Fixed Laboratory Measurements												
Major anions [2]	N/A	NA	NA	NA	300.0	0.03 mg/L	75-125	35	100	Cool 4C	1 Qt cubi	28 days
TSS		5% dup or 1 per 20	NA	liquid	160.2	2 mg/L	NA	35	100	Coo 4C	1 Qt cubi	7 days
Hardness		5% dup or 1 per 20	NA	liquid	130.1	0.05 mg/L	NA	35	100	HNO3 to pH < 2	1 Qt cubi	6 months
Dissolved Metals [3]		5% dup or 1 per 20	1 per 20	liquid	200 methods	<1 ppm	75-125	25	100	filtered HNO3 pH <2	1 Qt cubi or 1 L P	6 months
Total Metals [3]		5% dup or 1 per 20	1 per 20	liquid	200 methods	<1 ppm	75-125	25	100	HNO3 to pH < 2	1 Qt cubi or 1 L P	6 months
Mercury		5% dup or 1 per 20	1 per 20	liquid	245.1	0.2 mg/L	75-125	25	100	HNO3 to pH < 2	1 Qt cubi or 1 L P	28 days
Cyanide		5% dup or 1 per 20	1 per 20	liquid	335.2 4500CN-E 4500CN-I	5 mg/L or better	75-125	25	100	Cool 4C pH>12 0.8 g NaOH	1 Qt cubi	14 days
Nitrate-Nitrite	NA	NA	NA	NA	353.2	0.01 mg/L	75-125	35	100	Cool 4C	1 Qt cubi	28 days
pH		5% dup or 1 per 20	NA	water	150.1	NA	NA	$\pm$ 20RPD	100	Not Required	100 ml P, G	Analyze Immediately

[1] Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.

[2] - Major anions include Chloride, fluoride, sulfate and phosphate

[3] - Dissolved and total metals include arsenic, antimony, cadmium, chromium, copper, iron, lead, nickel, selenium, silver zinc and mercury

[4] - For cyanide determination: check sulfide in the sample with lead acetate paper; if sulfide is absent adjust pH>12 with 0.8 g NaOH; if Cl is present, add 0.6 g ascorbic acid.

Attachment 1. Sample Alteration Form

Project Name and Number: ____

Material to be Sampled: ____

Measurement Parameter:____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):
____
____
____
____

Reason for Change in Field Procedure or Analysis Variation:
____
____
____
____

Variation from Field or Analytical Procedure:
____
____
____
____

Special Equipment, Materials or Personnel Required:
____
____
____
____

Initiators Name:____ Date: _____________

Project Officer:____ Date:_____________

QA Officer:____ Date:_____________

Attachment 2. Corrective Action Form

Project Name and Number:____
Sample Dates Involved: ____
Measurement Parameter:____

Acceptable Data Range:____
____
Problem Areas Requiring Corrective Action:____
____
____
____

Measures Required to Correct Problem:____
____
____
____

Means of Detecting Problems and Verifying Correction:____
____
____
____

Initiators Name:_____________________________________ Date:_____________

Project Officer:_____________________________________ Date:_____________

QA Officer: _______________________________________ Date:_____________

Attachment 3: Mining Facility Site-Specific Inspection Plan (MFSSIP)

This MFSSIP will be prepared and used in conjunction with the Generic Mining Facility QAPP, Revision 1.1, Rev. 05/02 for collecting samples of opportunity during announced and unannounced inspections. Please refer to the Generic QAPP for specific details regarding MFSSIP. Note: Page 2, Table -1 DQOs : Do not remove analyte from this generic table. Fill in the number of samples for each applicable analysis/matrix. If the number of samples column is left blank for a particular analysis, the RSCC, QAO and LAB will presume that the analysis is not required for the project. Submit the MFSSIP to the RSCC for laboratory coordination/sample numbers/project information and to the QAO for review and concurrence. This form can be E-mailed to castrilli.laura@epa.gov or hall.christopher@epa.gov or faxed to 206-553-8210.

Project Account Code	**Sample Numbers**	**EPA Inspectors/Phone Numbers/Mail Stop**

COOPERATING AGENCIES/PARTIES INVOLVED:

Contact Person	Agency	Phone Number

LIST OF FACILITIES INSPECTED

Facility Name(s)	Address	Contact Person	E-mail/ phone Number	Dates	# Samples collected

FOR QAO ONLY

QA Reviewer Concurrence with the MFSSIP :________________________ Date :_________

____
Print Name and Sign

Table 1. Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Lot Blanks/	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
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Hardness		5% dup or 1 per 20	NA	liquid	130.1	0.05 mg/L	NA	35	100	HNO3 to pH < 2	1 Qt cubi	6 months
Dissolved Metals [3]		5% dup or 1 per 20	1 per 20	liquid	200 methods	<1 ppm	75-125	25	100	filtered HNO3 pH <2	1 Qt cubi or 1 L P	6 months
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Mercury		5% dup or 1 per 20	1 per 20	liquid	245.1	0.2 mg/L	75-125	25	100	HNO3 to pH < 2	1 Qt cubi or 1 L P	28 days
Cyanide		5% dup or 1 per 20	1 per 20	liquid	335.2 4500CN-E 4500CN-I	5 mg/L or better	75-125	25	100	Cool 4C pH>12 0.8 g NaOH	1 Qt cubi	14 days
Nitrate-Nitrite	NA	NA	NA	NA	353.2	0.01 mg/L	75-125	35	100	Cool 4C	1 Qt cubi	28 days
pH		5% dup or 1 per 20	NA	water	150.1	NA	NA	± 20RPD	100	Not Required	100 ml P, G	Analyze Immediately

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[4] - For cyanide determination: check sulfide in the sample with lead acetate paper; if sulfide is absent adjust pH>12 with 0.8 g NaOH; if Cl is present, add 0.6 g ascorbic acid.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

GENERIC QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR SE IDAHO PHOSPHATE MINES

APPROVAL OF QAPP:

___________________________________ Date: _____________
Dave Tomten, Project/Field Operations Coordinator

___________________________________ Date: ______________
, Project Manager
Groundwater Protection Unit, OW

____________________________________ Date: ______________
Randy Smith, Director
Office of Water

_____________________________________ Date:_______________
Barry W. Towns, Manager
QA and Data Unit, OEA

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Attachments

Attachment 1 - Sample Alteration Form
Attachment 2 - Corrective Action Form
Attachment 3 - Phosphate Mining Facility Site Specific Inspection Plan (PHSSIP)

1.0 Project Management Elements

1.1 Distribution List

Copies of the completed/signed project plan should be distributed to:

Project Compliance Officer (CO) Robert Grandinetti, OW
EPA Inspector/ Project Coordinator (PO) Dave Tomten, IOO
RSCC Laura Castrilli, OEA-095
QA Officer/or Designee Barry Towns, OEA-095
Lab Supervisory Chemist Joe Blazevich, LAB

Electronic copies of data are not required unless specifically requested.

1.2 Project/ Task Organization

This section identifies the personnel involved in SE Idaho phosphate mine inspection, sampling and analytical and defines their respective responsibilities in the project.

The following is a list of key project personnel and their responsibilities:

Inspector/Project Officer (Inspector) Dave Tomten (208) 378-5763__________
RSCC: Laura Castrilli (206) 553-4323
QA Officer (QAO): Barry Towns/or Designee (206) 553-1675
Laboratory (MEL): Joe Blazevich (360) 871-8705

Inspector - The inspector conducts the inspection under the authority provided by the Clean Water Act. Th inspector's responsibility is to prepare a final inspection report to be submitted to the immediate program ma based on the results of the inspection conducted and the sample analytical data obtained from the laboratory. I conjunction, the inspector shall also be responsible for:

- Site inspection and recording observations in a note book;
- Documenting the location of site using GPS;
- Conducting dye tracer tests if appropriate;
- Conducting direct readings such as pH, temperature, dissolved oxygen, etc... if appropriate;
- Collecting water or effluent samples if appropriate;
- Coordinating with the Regional Sample Control Center (RSCC) for regional sample numbers;
- Coordinating with the mobile EPA laboratory for sample analysis;

- Maintaining sample documentation, including chain of custody, photographs, and receiving sample anal results.

All of these tasks shall be performed in accordance with the approved Site Specific QA Plan for phosphate mi inspections in SE Idaho. Changes in procedure should be documented in an appropriate addendum to the plan sample alteration form included with the site specific inspection plan.

Regional Sample Control Center (RSCC) - RSCC resides within the Region 10 QA Office. The role of RSCC to coordinate and schedule sample delivery and analysis with the regional laboratory based on the information by the inspector in the Site Specific Inspection Plan Form (see attachment 1). For sample tracking, the RSCC provides the inspector with the regional sample numbers and the corresponding project work and account num

QA Officer - The QAO assists the PO and CO in the development of the Site Specific QA Project Plans (QAP The QA Office also reviews and approves site specific sampling plans, its subsequent revisions and amendmen

Laboratory - The Laboratory, Manchester Environmental Laboratory (MEL) located at Port Orchard, WA, is responsible for conducting laboratory analyses identified in Table 1 of the PHSSIP in accordance with the requirements specified in the QAPP and the analytical methods. The supervisory chemist is the technical lead laboratory responsible for assigning the appropriate personnel to the project. The laboratory is also responsib validating laboratory generated data prior to submission to PO.

1.3 Problem Definition/ Background

1.3.1 Background

Water pollution degrades surface waters making them unsafe for drinking, fishing, swimming, and other activi authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit pro controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Phosphate mining facilities are point sources and included in one of the 11 categories of "storm water discha associated with industrial activity" [40 CFR 122.26 (b)(14)(i)-(xi)] and are regulated under Section 402 of the Water Act and NPDES regulations. These facilities primarily engage in the production of phosphoric acid, sup phosphates or other manufactured phosphate compounds or chemicals and sites typically consist of many of t following basic components: open pits, haul roads, crushing and loading facilities, milling and other processir tailings ponds, waste rock dumps, sedimentation ponds, surface water runon/runoff controls, pit de-watering operations, maintenance facilities (including truck wash bays), and various best management practices which a contributing to storm water discharges generated by runoff from land and impervious areas such as paved stre parking lots, and building rooftops during rainfall and snow events.

EPA routinely conducts inspections of these facilities. During the inspections, “samples of opportunity” may collected. Analytical results obtained during inspections may be used to determine compliance with statutes and establish background or ambient concentrations in receiving waters. Results may also be used to support legal action under the Clean Water Act.

The purpose of this Generic Quality Assurance Project Plan (QAPP), therefore, is to provide Inspectors from

10 State Offices with basic Quality Assurance Project Plan (QAPP) that will address the project required Data Objectives and provide guidelines on sample collection, sample documentation, analytical methods and data v and interpretation of data deliverables. This document was prepared in compliance with the EPA Order 5360.1 the Agency required R5 document format, "EPA Requirements for Quality Assurance Project Plans", Final Ve March, 2001, and the "USEPA Region 10 Expanded Guidance for Preparing Quality Assurance Project Plans" Revision 1.0 dated 12/7/98.

1.3.2 Objectives/Scope

- Determine compliance with the Clean Water Act through the collection of samples of opportunity fron facilities inspected.

1.4 Project/ Task Description and Schedule

1.4.1 Project/Task Description

This Generic QA Project Plan is developed for the purpose of supporting phosphate mining facility inspection sampling activities that may be performed in conjunction with the Safe Water Drinking Act program. The sam be analyzed by MEL in accordance with the analytical methodologies specified in Table 1 - Data Quality Obje Summary of the PHSSIP. See the sample collection section and specific analyses that will be performed.

All of the analyses will be performed in accordance with the analytical methodology specified in Table 1 - Da Objectives Summary of the PHSSIP. See the sample collection section and specific analyses that will be perf

1.4.2 Schedule of Tasks *

Activity	Estimated Start Date	Estimated Completion Date	Comments
Obtain block of numbers from RSCC			
Mobilize to Sites	See PHSSIP		
Sample Collection			
On-site Analysis of Samples			
Data Validation			
Target Completion Date			

* Note: Since most of the inspections are unannounced and the facilities nor the parameters of concern are unknown, the inspectors are allowed to submit the Site Specific Inspection QA Plan within 30 days from the last day of sample collection.

1.4.3 Phosphate Mining Facilities Site-Specific Inspection Plan (PHSSIP)

The Phosphate Mining Facilities Site-Specific Inspection Plan (PHSSIP) is a two- page summary of the sampl analysis and QA requirements that may be performed during facility inspections. The PHSSIP is submitted to

Office within 30 days from the last day of sample collection. The first page of PHSSIP contains the project, t account code, EPA sample numbers assigned for inspection, list of facilities inspected, address, contact perso phone number, the names of inspectors conducting the inspection , their respective environmental organizatio affiliations, the total number of samples collected per facility, the parameters that were determined. The seco of PHSSIP consists of a Table summarizing the analytical requirements of the inspection, the number of samp collected, the parameters for analysis, the analytical procedure and methodologies that will be used and the Da Quality Objectives (DQOs) requirements of the inspection which are filled in by the EPA Inspector. If applica Attachment 1- Sample Alteration Form and Attachment 2- Corrective Action Form, may also be included with PHSSIP. The PHSSIP is submitted to the QA Office for review and approval before a scheduled sampling eve immediately after collecting samples of opportunity. A blank 2-page PHSSIP is attached at the end of this Ge QAPP.

1.5 Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are the quantitative and qualitative terms inspectors and project managers use describe how good the data needs to be in order to meet the project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, compar and measurement range. The overall QA objective for analytical data is to ensure that data of known and accep quality are provided. To achieve this goal, data must be reviewed for 1) representativeness, 2) comparability, 3 precision, 4) accuracy (or bias), and 5) completeness. Precision, accuracy, completeness, sample representat and data comparability are necessary attributes to ensure that analytical data are reliable, scientifically sound, a defensible. Each analytical result or set of results generated should be fully defensible in any legal action, wh administrative, civil or criminal.

Precision: The precision of each test depends on the number of tubes used for the analysis. The method that for the CAFO analysis (SM 9221) utilizes a confidence limit of 95 %. Samples in duplicate will be analyzed of samples collected. The precision can be evaluated by the Relative Percent Difference (RPD) between the samples.

Accuracy: This is not true relative to microbiology. The method has a detection limit of 1 MPN/100 ml. Fo parameters analyzed in the fixed laboratory, accuracy will be evaluated by the use percent recovery (%R) of th analyte in spiked samples and also the recoveries of the surrogates in all samples and QC samples.

$$\% \text{ Recovery} = \frac{SQ - NQ}{S} \times 100$$

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (unspiked) sample
S = quantity of spike or surrogate added to native sample

Representativeness is the degree to which data from the project accurately represent a particular characteristi environmental matrix which is being tested. Representativeness of samples is ensured by adherence to standa sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of sam should provide a representativeness of each matrix or product of the chemical processes being sampled.

Comparability is the measurement of the confidence in comparing the results of one experiment with the resu different experiments using the same matrix, sample location, sampling techniques and analytical methodolog

Completeness: Completeness is the percentage of valid results obtained compared to the total number of sam taken for a parameter. Since sampling from inspections are usually grab and limited in number of samples, the of valid results obtained from the analyses are expected to be equal or better than 85%. %Completeness may calculated using the following formula:

$$\% \text{ Completeness} = \frac{\# \text{ of valid results}}{\# \text{ of samples taken}} \times 100$$

The QA objectives outlined, above, will be evaluated in conjunction with the data validation process.

1.6 Special Training Requirements/Certification

Inspectors are required to complete the 24-hour Basic Health and Safety training. The inspectors will obtain a health and safety training certification from the 24-hour training which should be maintained current by attend hour safety training refresher course every year. The inspectors must also have a signed and current "credenti certifying the bearer as "Authorized to Conduct Investigations and Inspections Pursuant to All Federal Laws Administered by the United States Environmental Protection Agency". All of the training courses listed abov provided by EPA Region X. Furthermore, sampling and sample documentation skills are also assured by the "mentoring" provided by the senior inspectors in the field.

Scientists (Microbiologists/Chemists) performing the analytical work for this project have extensive knowle and demonstrated experience in the execution of the analytical methods being requested.

1.7 Documentation and Records

Complete documentation for inspections may include but not limited to the following forms which has to be c and collated by the EPA Inspector:

Investigation Report
Records Inspection Checklist
Chain of Custody Logs
Record of Sampling
Laboratory Analysis Reports
Photographs, Sketches, Paper Copies, Chemical Labels, MSDS, Application Records or other documentati

Investigators will maintain field notes in a bound notebook and all documents, records, and data collected will in a case file and submitted to the program office with the final inspection report.

The following documents will be archived at the Manchester Environmental Laboratory or the designated labo performing the analysis: (1) signed hard copies of sampling and chain-of-custody records (2) electronic and of analytical data including extraction and sample preparation bench sheets, raw data and reduced analytical da

The laboratory will store all sample receipt, sample login, extraction documentation, and laboratory instrumen documentation per SOP.

2.0 Measurement/ Data Acquisition

2.1 Sampling Process Design

Prior to compliance inspections, the EPA Inspector will review and evaluate facility files, if available, which i include facility background information, historical ownership, facility maps depicting general geographic loca property lines, surrounding land uses, a summary of all possible source areas of contamination, a summary of permits requested and/or received, any enforcement actions and their subsequent responses and a list of docur studies prepared for the facility, records and inspection reports from previous compliance site visits.

Based on the data and visual inspection of the facility, samples of opportunity on an "as needed" basis will be for analysis to characterize the pollutants and determine if they are in compliance with the Clean Water Act.

2.2 Inspection and Sample Collection Procedures

2.2.1 Location

Inspectors should use the Global Positioning System (GPS) for documenting locations of facilities inspected. calibrated GPS instrument can be checked out through the Quality Assurance and Data Unit. Instructions on tl GPS is included in Attachment 4.

2.2.2 Sample Collection

Sample collection methods can vary between standard operating procedures used by samplers and different co encountered in the field. The following is as general guidance for samplers. Whatever the case, samplers sho document in their notes or field checklist the actual method used to obtain samples.

If samples are collected manually, rubber gloves should be worn to protect the sampler. Also, the use of safet should be considered. Additional safety information should be covered in a site safety plan or pre-inspection briefing.

When a discharge point is identified, the sampler should consider collecting, when possible, samples at a mini one collection point. This collection point should be obtained at the discharge point. More sample collectior may be collected by the inspectors if necessary.

When dip samples are taken for coliform analysis, the sampler should carefully remove the foil cap, ensuring t neither the inside of sample bottle or cap are touched. If possible, hold the foil-covered cap, do not set it dow

To the extent possible, take the sample by holding the bottle near its base in the hand and plunging it, neck dow below the surface. Use an extension pole if needed to keep from walking into the effluent stream and stirring u sampling area. Turn bottle until neck points slightly upward and mouth is directed towards the current. If ther current, create a current by pushing bottle forward horizontally in a direction away from the hand. If available, special apparatuses that will permit mechanical removal of the cap below the water surface. This can be used t potential contamination of the sample by the sampler.

After collection, carefully recap the sample bottle securely leaving the foil cap in place. There should be a 1 i space in the neck of the bottle, to allow adequate mixing by the analyst. If, however, the sample container is o DO NOT pour out any excess sample. Place the cap back securely on the sample bottle and return to analyst overfilled and a notation will be made in the analyst's report. The sample bottle should be labeled with the date time of collection, collector's name and sample number, and type of analysis requested. This information sho written on the label using an indelible, waterproof ink. Sample bottle should be placed in plastic bags and stor immediately following collection until they are accepted by the analyst. Proper chain of custody procedures s followed at all times.

<u>Transfer blank</u>: Each inspector will be provided a single transfer blank for each facility to be inspected and an sterile bottle. Half way through the sample collection for each facility, transfer the contents of the full bottle bottle. Be careful not to contaminate the inside of the bottle or cap during transfer. Label this bottle with dat of transfer, name of collector, sample number and label the bottle as a TRANSFER BLANK.

If analysis of additional parameters is needed in a specific case, additional sample containers may be needed. sample volume, container type, preservation techniques, and holding times for parameters likely to be sampled included in (Table 3). <u>Inspectors should use their discretion on which parameters should be used to document violations at a particular facility and are encouraged to discuss this with representatives of the NPDES prograr</u>

2.2.3 Sample Equipment

Equipment needs will vary from inspection to inspection. The list in Table 2 provides suggestions to be consi prior to leaving for the field.

Table 2 -Suggested Sample Equipment for Field Inspections

General	Safety	Emergency
Inspector Credentials Field Notebook Camera Waterproof Pens & Markers Clipboard flashlight Extension Sampling Pole Sample containers Ice Chest Disinfectant Solution (bleach) and Water for boots[1] Extra Set of Coveralls	Water Proof (Rubber) Boots Rain gear Rubber gloves Soap, towels, and water for washing hands Eye protection Hard hat	First Aid Kit Phone numbers Cell Phone

1 Samplers should disinfect rubber boots before exiting CAFO facilities to help avoid transmitting animal pathogens from one facility to another. See Section 2.2.1 Health and Safety.

2.2.4 Shipping Requirements

All of the samples are hand-delivered to the laboratory analyzing the samples. Samples for coliform analysis v hand-delivered to the mobile microbiology laboratory within 6 hours of sample collection. Sufficient ice mus provided to assure that samples remain cold until received and processed by the laboratory.

2.2.5 Sample Custody

Samples will be kept in the custody of EPA personnel at all times. Region 10 Chain of Custody procedures ar will be used. Custody seals will be placed on all shipping containers.

2.2.6 Decontamination Procedures

Samples will be collected using disposable sampling devices and sample collection gears. Inspectors will follo proper health and safety procedures when collecting and handling samples to minimize or not to incur contami

2.3 Analytical Methods Requirements

Not all parameters will be measured for each facility inspected. In some cases no samples will not be taken at Table 3 -Data Quality Objective Summary lists the parameters that can be measured under this plan, the accura precision, preservative and holding times requirements.

2.4 Quality Control Requirements

Quality Control procedures for analyte measurements will be according to the requirements specified in the m will be used in the analysis.

Laboratory instrumentation will be calibrated in accordance with the analytical procedure. Laboratory instrum will be maintained in accordance with the instrument manufacturer's specifications and the laboratory Standar Operating procedures (SOPs).

Other Quality Control Measures

- Media, reagents and water - Media and reagent water required for field analysis will be prepared at the MEI transported to the field site. QC tests specified for drinking water analysis will be conducted on these sup to being transported. Media will be stored in tightly capped tubes in such a way to prevent formation of air and adverse environmental effects.

- Incubator and waterbath - temperature will be maintained within specified temperature ranges. Thermome for recording temperatures will be calibrated against NIST certified thermometer on a yearly basis. Tempe will be read and recorded twice daily. Waterbath will be transported without water. Water will be added w laboratory is delivered.

- Refrigerator (if present)- temperature will be maintained within specified temperature ranges. Thermome for recording temperatures will be calibrated against NIST certified thermometer on a yearly basis. Tempe will be read and recorded twice daily.

- Positive and negative controls:

  Positive and negative culture controls: organisms as specified in SM 9020B (Intra-laboratory QC guideline used on a daily basis to ensure the quality of the media and laboratory equipment has not changed.

- Duplicates:

  Five percent of routine samples (1 per batch of 20) will be processed in duplicate, or a minimum of one pe that samples are received, whichever is greater. A duplicate sample is performed from the same sample bo

- Laboratory Temperature:

  Must be maintained within a few degrees of 35 °C to ensure incubator temperature consistency. This will accomplished with the use of thermostatically controlled electric heaters or thermostatically controlled pr forced air heater.

- Temperature Blank:

  A temperature blank is a liquid in a bottle used as sample shipping cooler temperature indicator and is sent each cooler shipped. This temperature of the liquid in the bottle is measured upon opening the cooler and unpacking the samples or removing the packing materials.

- Sample Disposal:

All “spent” growth media will be autoclaved prior to disposal. All unused water samples will be disposed c manner that will not result in contamination of the surrounding environment.

2.5 Instrument/Equipment Testing, Inspection and Maintenance Requirements

The laboratory will follow their standard operating procedures for any preventative maintenance required on la instruments or systems used for this project.

2.6 Instrument Calibration and Frequency

Field maintenance and calibration will be performed where appropriate prior to use of the instruments. Calibra samplers will be performed in accordance with the methodologies used in sample collection and the Instrume Operational Instructions.

The laboratory will follow the calibration procedures found in the methods listed in Table 1 or in the laborator

2.7 Inspection/Acceptance Requirements for Supplies and Consumables

All sample jars used for chemical analysis in this project will be new and certified clean provided by the labora Inspectors will make note of the information on the certificate of analysis that accompanies sample jars to ens they meet the specifications and guidance for contaminant free sample containers.

2.8 Data Acquisition Requirements (non-Direct Measurements)

Not Applicable.

2.9 Data Management

A field log notebook, photos, GPS location data and the Field Sample and Chain of Custody Data Sheets will b to document the sampling and inspection activities. For each sample location, the following will be recorded notebook: facility name and address, sample number, date, time of each sample collection, physical descriptic sample collection point, weather conditions, color, sample appearance, sample identifier, and measurements. Sample and Chain of Custody Data Sheets will have the following information: site name, sample number, date each sample collection, sampler’s name or initials and sampling location. If applicable, a suffix l -FD will be a to the sample identified as the field duplicate. For fixed laboratory analyses, field duplicates will be assigned unique sample identifier and will be submitted ‘blind’ to the analytical laboratory. Analytical duplicate results reported with a trailing -AD (analytical duplicate) or D.

All inspection reports including those for potential enforcement cases will be completed <u>within 30 days of in date</u>. Validated laboratory results and interpretation (if necessary) will be appended. Reports will be maintain enforcement confidential documents until release is approved by the USEPA Office of Regional Counsel (OR Photographs and other supporting data along with the inspection report will be used to determine NPDES com

All data generated during this project will be processed, stored, and distributed according to laboratory's SOP

3.0 Assessment/Oversight

3.1 Assessments and Response Actions

The EPA Inspector will be responsible for reviewing field log notebooks for accuracy and completeness withi hours of each inspection. Sample results provided to the EPA Inspector by the laboratory will be appended to inspection reports. The EPA Inspector will compare the sample information in the field log notebooks with th analytical results appended to the inspection report to ensure that no transcriptions errors have occurred.

With the exception of the microbiological analyses, RPDs between field duplicate and analytical duplicate measurements will be calculated by the laboratory. RPD's greater than the project requirements will be noted associated inspection reports.

Laboratories routinely perform performance checks using different program specific quarterly blind and doul check standards. Each method of analysis requires specific QA/QC runs that must be complied with by the lab performing the analysis. An internal assessment of the data and results are also routinely conducted by the ap supervisors and the Laboratory QA Coordinator. No additional audits will be performed on the laboratory for project.

Corrective action procedures that might be implemented from QA results or detection of unacceptable data wi developed if required and documented in Attachment 2.

3.2 Reports to Management

Only the data validation reports with the properly qualified data shall be provided to Mr. Dave Tomten of the Ic Operations Office (IOO). If, for any reason, the schedules or procedures above cannot be followed, the EPA Inspector must complete the Attachment 1- Sample Alteration Form (SAF). The SAF should be reviewed and approved by the QAO. The laboratory should be given a copy of the QAO approved SAF for reference and pro file.

4.0 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The criteria for the validation will follow those specified in this QA plan and the criteria specified in the meth

4.2 Validation and Verification Methods

All data generated shall be validated in accordance with the <u>QA/QC requirements specified in the methods, anc technical specifications outlined in the QAPP.</u> The summary of all analytical results will be reported to the EI Inspector and the NPDES compliance officer. The raw data for this project shall be maintained by the laborato Data validation will be performed by the laboratory for all the analyses prior to the release of data. The laborat also archive the analytical data into their laboratory data management system.

4.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in a data report pacl

Table 3. Data Quality Objectives Summary

Analytical Group	Number of Samples[1]	# of QA Samples: Field Dups / Field Blanks / Lot Blanks/	MS / MSD Samples	Matrix	Method	Method Detection Limits	Accuracy	Precision (RPD)	Complete-ness	Preserva-tion	Volume, Container	Holding Time (days)
Fixed Laboratory Measurements												
Major anions [2]	N/A	NA	NA	NA	300.0	0.03 mg/L	75-125	35	100	Cool 4C	1 Qt cubi	28 days
TSS	8	5% dup or 1 per 20	NA	liquid	160.2	2 mg/L	NA	35	100	Coo 4C	1 Qt cubi	7 days
Hardness	8	5% dup or 1 per 20	NA	liquid	130.1	0.05 mg/L	NA	35	100	HNO3 to pH < 2	1 Qt cubi	6 months
Dissolved Metals [3]	8	5% dup or 1 per 20	1 per 20	liquid	200 methods	<1 ppm	75-125	25	100	filtered HNO3 pH <2	1 Qt cubi or 1 L P	6 months
Total Metals [3]	8	5% dup or 1 per 20	1 per 20	liquid	200 methods	<1 ppm	75-125	25	100	HNO3 to pH < 2	1 Qt cubi or 1 L P	6 months
Mercury	0	5% dup or 1 per 20	1 per 20	liquid	245.1	0.2 mg/L	75-125	25	100	HNO3 to pH < 2	1 Qt cubi or 1 L P	28 days
Cyanide	0	5% dup or 1 per 20	1 per 20	liquid	335.2 4500CN-E 4500CN-I	5 mg/L or better	75-125	25	100	Cool 4C pH>12 0.8 g NaOH	1 Qt cubi	14 days
Nitrate-Nitrite	NA	NA	NA	NA	353.2	0.01 mg/L	75-125	35	100	Cool 4C	1 Qt cubi	28 days
pH	8	5% dup or 1 per 20	NA	water	150.1	NA	NA	$\pm$ 20RPD	100	Not Required	100 ml P, G	Analyze Immediately

[1] - Sample number includes QA samples and Matrix Spike / Matrix Spike Duplicate (MS/MSD) samples listed in the next two columns. P,G - Plastic, Glass.
[2] - Major anions include Chloride, fluoride, sulfate and phosphate
[3] - Dissolved and total metals include arsenic, antimony, cadmium, chromium, copper, iron, lead, nickel, selenium, silver zinc and mercury
[4] - For cyanide determination: check sulfide in the sample with lead acetate paper; if sulfide is absent adjust pH>12 with 0.8 g NaOH; if Cl is present, add 0.6 g ascorbic acid.

Attachment 1. Sample Alteration Form

Project Name and Number: ____

Material to be Sampled: ____

Measurement Parameter: ____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):

____

Reason for Change in Field Procedure or Analysis Variation:

Variation from Field or Analytical Procedure:

Special Equipment, Materials or Personnel Required:

Initiators Name:____ Date: _____________

Project Officer:____ Date:_____________

QA Officer:____ Date:_____________

Attachment 2. Corrective Action Form

Project Name and Number:____
Sample Dates Involved: ____
Measurement Parameter:____

Acceptable Data Range:____
____
Problem Areas Requiring Corrective Action:____
____
____
____

Measures Required to Correct Problem:____
____
____
____
Means of Detecting Problems and Verifying Correction:____
____
____
____

Initiators Name:______________________________________ Date:_____________

Project Officer:______________________________________ Date:_____________

QA Officer: ____ Date:_____________

Attachment 3: Phosphate Mining Facility Site-Specific Inspection Plan (PHSSIP)

This PHSSIP will be prepared and used in conjunction with the GenericPhospahte Mining Facility QAPP, Revision 1.0, Rev. 04/02 for collecting samples of opportunity during an announced and unannounced inspections. Please refer to the Generic QAPP for specific details regarding CSSIP. Note: Page 2, Table -1 DQOs : Do not remove analyte from this generic table. Fill in the number of samples for each applicable analysis/matrix. If the number of samples column is left blank for a particular analysis, the RSCC, QAO and LAB will presume that the analysis is not required for the project. Submit the PHSSIP to the RSCC for laboratory coordination/sample numbers/project information and to the QAO for review and concurrence. This form can be E-mailed to castrilli.laura@epa.gov or hall.christopher@epa.gov or faxed - 206-553-8210.

Project Account Code	**Sample Numbers**	**EPA Inspectors/Phone Numbers/Mail Stop**

COOPERATING AGENCIES/PARTIES INVOLVED:

Contact Person	Agency	Phone Number

LIST OF FACILITIES INSPECTED

Facility Name(s)	Address	Contact Person	E-mail/ phone Number	Dates	# Samples collected

FOR QAO ONLY

*QA Reviewer Concurrence with the PHSSIP :*________________________ *Date :*_________

____
Print Name and Sign

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